

Spectral Data for Highly Ionized Krypton, Kr V through Kr XXXVI

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Spectral Data for Highly Ionized Krypton, Kr v through Kr xxxvi

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Wavelengths, energy levels, ionization energies, line classifications, intensities and transition probabilities for Kr v through Kr xxxvi, with the exception of Kr xi through Kr xvii, are tabulated. No data have been published for Kr xi through Kr xvii. These data are based on the energy levels compilation of Sugar and Musgrave [13]. Transition probabilities for selected M1 lines have been reported and are quoted here. A short review of the line identifications and wavelength measurements is given for each stage of ionization. The literature has been surveyed through February 1995. ©1995 American Institute of Physics and American Chemical Society.

Key words: atomic data; energy levels; Grotrian diagrams; krypton; ions; spectra; transition probabilities; wavelengths.

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1. Introduction

We have undertaken publication of a series of compilations of spectra of highly ionized atoms of particular interest to the fusion energy community. These selected elements occur as impurities in wall materials of fusion machines or are specifically injected into the hot plasmas for diagnostics and plasma control. Much work on these spectra has appeared in recent years. We have critically compiled these data into single monographs for each element, including wavelengths, line classifications, intensities, transition probabilities, and a short review of the literature for each ion. We cite the uncertainties of the data as given by the authors. These rarely include the confidence level, but it is reasonable to assume that they represent at least one standard deviation of the measurements. We have previously published such compilations [1–9] for Ti, V, Cr, Mn, Fe, Co, Ni, Cu and Mo (Z=22–29, 42). The present compilation contains data for Kr v through Kr xxxvi, except for Kr xi through Kr xvii, for which no data have been

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published. One of the authors (T. S.) will supply Grotrian diagrams upon request from readers.

All relevant papers published through February 1995 were collected and critically evaluated, and the best measurements, in our judgement, were included in the tables. We also consulted the following comprehensive compilations: for wavelengths the tables by Kelly [10], for forbidden lines arising within ground configurations of the type ns^2np^k ($n=2$ and 3, $k=1$ to 5) the paper by Kaufman and Sugar [11], and a review article by Fawcett [12].

Sugar and Musgrove [13] have published a critical compilation of energy levels of Kr in all stages of ionization. Their values are adopted for this compilation, except where superseded by more recent data. For the He- and H-isoelectronic sequences, only theoretical results are given since they are considered to be more accurate than the experimental values. The latter are cited in the brief review.

We caution that the intensity estimates in experimental work are usually visual estimates of relative plate blackening. There is generally no correlation between intensity estimates by different authors, or by the same author for widely different wavelength ranges.

We give wavelengths in air above 2000 Å and in vacuum below 2000 Å. For conversion of ionization energies from cm⁻¹ to eV, we use the conversion factor 8065.5410 ± 0.0024 cm⁻¹/eV given by Cohen and Taylor [14]. In the following section we give brief comments on each ion, including the accuracy of the wavelength data.

1.1. Acknowledgments

The present research was organized and inspired by Dr. T. Hiraoka, Chairman of the Research Committee on Atomic and Molecular Data of the Japan Atomic Energy Research Institute, to whom we owe special thanks. This work was partially supported by the U.S.-Japan Fusion Cooperation Program and by the Office of Magnetic Fusion Energy of the U.S. Department of Energy.

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2. Brief Comments on Spectra of Each Krypton Ion

Kr v (Ge sequence)

Ground state $1s^22s^22p^63s^23p^63d^{10}4s^24p^2\ ^3P_0$

Ionization energy $521\ 800\text{ cm}^{-1}$ (64.7 eV)

The $4s^24p^2 - 4s^24p\ 4d$ and $4s^24p^2 - 4s\ 4p^3$ transition arrays were identified by Fawcett and Bromage [1]. They measured 29 lines in the range of 465–811 Å with an uncertainty of ± 0.03 Å. More accurate wavelengths and an extended analysis were given by Trigueiros *et al.* [2] in the range of 434–910 Å. They augmented the identifications to 50 lines, including revisions of classifications of a few lines in Ref. 1. Observations were made with a theta-pinch plasma source with a measurement uncertainty of ± 0.01 Å. We have adopted their results.

Kr vi (Ga sequence)

Ground state $1s^22s^22p^63s^23p^63d^{10}4s^24p\ ^2P_{1/2}^o$

Ionization energy $633\ 100\text{ cm}^{-1}$ (78.5 eV)

The $4s^24p - 4s\ 4p^2$ and $4s^24p - 4s^24d$ transition arrays were identified by Fawcett *et al.* [3] in a Z-pinch plasma source. Trigueiros *et al.* [4] reobserved the spectrum more fully in a wider range of 450–960 Å using a theta-pinch plasma source. They classified seven lines in the range of 936–960 Å as the $4s^24d\ ^2D - 4s^25p\ ^2P^o$ doublet. The uncertainty of their wavelengths is ± 0.01 Å.

Twenty-two emission lines, including intercombination transitions, from the terms of $4s\ 4p^2\ ^4P$, $4p^3\ ^4S^o$, $^2D^o$, $^2P^o$, $4s^25s\ ^2S$, and $4s^24f\ ^2F^o$ were identified by Tauheed *et al.* [5] in a beam-foil spectrum in the range of 363–1054 Å. The uncertainty of their wavelengths varies from ± 0.2 Å to ± 0.5 Å. The spectrum was observed from 230–2540 Å by Pagan *et al.* [6] with an uncertainty of ± 0.01 to ± 0.005 Å. New values for the $4s\ 4p^2\ ^2S$ level and the $4s^25p\ ^2P_{1/2,3/2}^o$ were found, replacing those given in Ref. 4. The $4s^24f^2F_{5/2,7/2}^o$ levels reported in Ref. 5 were revised and the designations were changed to $4s\ 4p(^1P^o)4d\ ^2F^o$ in accordance with a calculation of the eigenvectors. The value for the $4p^3\ ^2P_{1/2}^o$ level given in Ref. 5 was also changed. In addition to these corrections Pagan *et al.* [6] identified most of the levels of the $4s\ 4p\ 4d$ configuration and all but one of the $4s\ 4p\ 5s$. They have reevaluated all of the energy levels with their new measurements and have given percentage compositions for them.

It should be noted that earlier works of Druetta and Buchet [7] and Livingston [8] are less accurate and incompatible with the level scheme adopted here.

Jacquet *et al.* [9] observed three-electron capture transitions $4s^26g-4s^27h$ and $4s^26h-4s^27i$ at 3381.7 Å and 3394.7 Å.

Kr vii (Zn sequence)

Ground state $1s^22s^22p^63s^23p^63d^{10}4s^2\ ^1S_0$

Ionization energy 895 300 cm⁻¹ (111.0 eV)

The first observation was reported by Fawcett *et al.* [3], who identified the $4s^2\ ^1S_0-4s4p\ ^1P_1$ resonance line at 585.37 Å and the $4s4p\ ^3P_2-4p^2\ ^3P_2$ line at 618.67 Å in a Z-pinch plasma discharge. The analysis was extended by Druetta and Buchet [7], Livingston [8], and Pinnington *et al.* [10] with beam-foil plasma sources and by Trigueiros *et al.* [11] using a theta-pinch plasma source. Trigueiros *et al.* [11] identified 22 lines as transitions between levels of the $4s^2$, $4s4d$, $4p^2$, and $4s4p$ configurations with an uncertainty of ±0.01 Å. Their results are given here.

Trigueiros *et al.* [12] identified 17 new lines in the range of 200–2070 Å comprising the $n=4-4$, $n=4-5$, and $n=5-5$ transitions, with an uncertainty of ±0.01 Å. The $n=4-5$ transitions were also observed by Bouchama *et al.* [13] in an experiment on electron capture into excited states. Extended analyses were made by Pinnington *et al.* [14] in a beam-foil experiment. They reobserved the spectrum in the range of 554–2080 Å with uncertainties of ±0.2 Å to ±0.5 Å. Wavelengths adopted here are taken from Refs. 12, 13, and 14. Five lines in Ref. 12 from the upper levels $4s5s\ ^1S_0$ and $4s5p\ ^1P_1$ and 3P_0 at 200.07 Å, 356.33 Å, 704.32 Å, 831.07 Å, and 2068.83 Å have been omitted, because they are inconsistent with the measurements of Bouchama *et al.* [13] and with Pinnington *et al.* [14]. Moreover, the $4s5s\ ^3S_1-4s5p\ ^3P_1$ lines at 1832.5 Å and 1847.5 Å in Ref. 14 disagree by 1.2 Å and 1.3 Å with those calculated from the level values. However, they are retained as tentative classifications.

Jacquet *et al.* [9] observed double-electron-capture transitions by Kr⁸⁺ ions impinging on neutral Li. Transitions $4snl-4sn'l'$ with $n \geq 6$ in the range of 2494–5659 Å were identified. They have been omitted because their classifications are incomplete.

Kr viii (Cu sequence)

Ground state $1s^22s^22p^63s^23p^63d^{10}4s\ ^2S_{1/2}$

Ionization energy 1 014 665 cm⁻¹ (125.802 eV)

The resonance doublet $4s\ ^2S-4p\ ^2P^o$ was first identified by Fawcett *et al.* [3] in a Z-pinch plasma and by Druetta and Buchet [7], who also observed the three lines of the $4p\ ^2P^o-4d\ ^2D$ doublet in a beam-foil spectrum. Livingston *et al.* [15] reobserved the spectrum in the range of 180–2000 Å with a beam-foil plasma. They identified twenty new transitions, including $4d-4f$, $4f-5g$, $5g-6h$, and $6h-7i$. The $4p\ ^2P_{1/2,3/2}-5d\ ^2D_{3/2,5/2}$ lines at 201.1 Å and

204.9 Å were newly identified by McPherson *et al.* [16]. Improved measurements in the range of 288–2000 Å were made by Gallardo *et al.* [17] with a theta-pinch plasma with an uncertainty of ±0.02 Å. The $5p-6s$ transition was observed by them and Bouchama *et al.* [13] who also reported $n=4-6$ transitions.

Reader *et al.* [18] provided identifications of the $3d^{10}nl-3d^{10}n'l'$ transitions through $7i$, as well as $3d^{10}4s-3d^94s4p$, and $3d^{10}4p-3d^94p^2$ transitions in the range of 114–700 Å. Their wavelength uncertainty was ±0.008 Å. They used wavelengths for lines above 1000 Å from Gallardo *et al.* [17]. We quote their results. Calculated values are given for the $5p-6s$ and $4d-6p$ lines, because the measured wavelengths [13,17] are inconsistent with those calculated from the levels of Reader *et al.* [18].

In colliding beams of Kr⁸⁺ and Li Jacquet *et al.* [9] observed 46 lines above 1916 Å and ascribed them to Kr⁷⁺ due to electron-capture. We adopt all the classifications except for the $7p-7d$, $5f^2F_{7/2}^o-6d\ ^2D_{5/2}$, and $6d\ ^2D_{5/2}-7p\ ^2P_{3/2}$ doublets because of deviations greater than 1 Å present between their wavelengths and those calculated from the levels of Reader *et al.* [18].

Kr ix (Ni sequence)

Ground state $1s^22s^22p^63s^23p^63d^{10}\ ^1S_0$

Ionization energy 1 862 900 cm⁻¹ (230.85 eV)

The $3d^{10}-3d^94p$, $4f$ resonance transitions were identified by Fawcett and Gabriel [19] in a theta-pinch plasma. Reader *et al.* [18] made improved measurements for these transitions with an uncertainty of ±0.005 Å in a low-inductance spark discharge.

Kr x (Co sequence)

Ground state $1s^22s^22p^63s^23p^63d^9\ ^2D_{5/2}$

Ionization energy 2 163 000 cm⁻¹ (268.2 eV)

Fawcett and Gabriel [19] identified five lines belonging to the $3d^9-3d^84p$ array in the range of 99–104 Å. Reader *et al.* [20] classified 44 lines in the range of 91–105 Å obtained with a spark discharge as the $3p^63d^9-3p^53d^{10}$ and $3p^63d^9-3p^63d^84p$ transitions. The uncertainty of their wavelengths is ±0.005 Å. We quote their results.

Kr xi (Fe sequence)

Ground state $1s^22s^22p^63s^23p^63d^8\ ^3F_4$

Ionization energy 2 486 000 cm⁻¹ (308.2 eV)

No wavelengths have been reported for this spectrum.

Kr xii (Mn sequence)Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^7 4F_{9/2}$ Ionization energy $2\ 824\ 000\ \text{cm}^{-1}$ (350.1 eV)

No wavelengths have been reported for this spectrum.

Kr xiii (Cr sequence)Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 5D_4$ Ionization energy $3\ 153\ 000\ \text{cm}^{-1}$ (390.9 eV)

No wavelengths have been reported for this spectrum.

Kr xiv (V sequence)Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 6S_{5/2}$ Ionization energy $3\ 602\ 000\ \text{cm}^{-1}$ (446.6 eV)

No wavelengths have been reported for this spectrum.

Kr xv (Ti sequence)Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^4 5D_0$ Ionization energy $3\ 967\ 000\ \text{cm}^{-1}$ (491.8 eV)

No wavelengths have been reported for this spectrum.

Kr xvi (Sc sequence)Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3 4F_{3/2}$ Ionization energy $4\ 361\ 000\ \text{cm}^{-1}$ (540.7 eV)

No wavelengths have been reported for this spectrum.

Kr xvii (Ca sequence)Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2 3F_2$ Ionization energy $4\ 771\ 000\ \text{cm}^{-1}$ (591.5 eV)

No wavelengths have been reported for this spectrum.

Kr xviii (K sequence)Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2 2D_{3/2}$ Ionization energy $5\ 170\ 000\ \text{cm}^{-1}$ (641 eV)

The $3p^6 3d - 3p^5 3d^2$ and $3p^6 3d - 3p^6 4f$ lines in the ranges of $91.3 - 93.6\ \text{\AA}$ and $35.1 - 35.4\ \text{\AA}$, respectively, were first identified by Wyart and the TFR Group [21]. Their tokamak plasma measurements have an uncertainty of $\pm 0.015\ \text{\AA}$. The spectrum in the range of $92.2 - 102\ \text{\AA}$ was reobserved by Kaufman *et al.* [22] with an uncertainty of $\pm 0.005\ \text{\AA}$ in a similar light source. They found four of the seven lines given by Wyart and the TFR Group [21] and identified two new lines at $99.330\ \text{\AA}$ and $102.001\ \text{\AA}$ as the $3p^6 3d - 3p^5 (^2P^o) 3d^2 (^1G) ^2F_{7/2}, (^3F) ^2F_{5/2}$ transitions.

Kr xix (Ar sequence)Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 1S_0$ Ionization energy $6\ 339\ 000\ \text{cm}^{-1}$ (785.9 eV)

The resonance transitions $3p^6 1S_0 - 3p^5 3d 1P_1, 3D_1$ were identified by Wyart and the TFR Group [21] as the lines at $96.263 \pm 0.015\ \text{\AA}$ and $118.063 \pm 0.015\ \text{\AA}$ observed in a tokamak plasma. Sugar *et al.* [23] reobserved them at $96.238\ \text{\AA}$ and $118.672\ \text{\AA}$ with a similar light source. From a plot of transition energy differences between observed and calculated values along the isoelectronic sequence they derived smoothed values with an uncertainty of $\pm 0.005\ \text{\AA}$. We adopted their results.

Kr xx (Cl sequence)Ground state $1s^2 2s^2 2p^6 3s^2 3p^5 2P_{3/2}^o$ Ionization energy $6\ 719\ 000\ \text{cm}^{-1}$ (833.0 eV)

Four lines of the $3p^5 - 3p^4 3d$ array were identified by the TFR Group and Wyart [26] with an uncertainty of $\pm 0.02\ \text{\AA}$. Improved measurements were obtained by Kaufman *et al.* [25] with an uncertainty of $\pm 0.005\ \text{\AA}$.

Kr xxI (S sequence)Ground state $1s^2 2s^2 2p^6 3s^2 3p^4 3P_2$ Ionization energy $7\ 129\ 000\ \text{cm}^{-1}$ (883.9 eV)

Six lines of the $3p^4 - 3p^3 3d$ array were identified by Kaufman *et al.* [27] with an uncertainty of $\pm 0.007\ \text{\AA}$. They predicted energy levels of the $3p^4$ ground configuration and gave predicted wavelengths for the magnetic-dipole transitions: $^3P_0 - ^3P_1, ^3P_2 - ^3P_1, ^3P_1 - ^1D_2, ^3P_2 - ^1D_2$, and $^3P_1 - ^1S_0$. Roberts *et al.* [24] ascribed the line at $1268.7 \pm 0.2\ \text{\AA}$ observed in a tokamak discharge to the $^3P_2 - ^3P_1$ line.

Kr xxII (P sequence)Ground state $1s^2 2s^2 2p^6 3s^2 3p^3 4S_{3/2}^o$

Ionization energy $7\ 555\ 000\ \text{cm}^{-1}$ (936.7 eV)

Sugar *et al.* [28] classified six lines of the $3p^3-3p^23d$ array, obtained with an uncertainty of $\pm 0.005\ \text{\AA}$ in a tokamak discharge. They derived the energy levels of the $3p^3$ ground configuration by interpolation on a curve of calculated minus observed M1 transition energies, and gave a predicted wavelength of $913.1 \pm 0.2\ \text{\AA}$ for the ${}^2\text{D}_{5/2}-{}^2\text{P}_{3/2}$ magnetic-dipole transition. This was found by Roberts *et al.* [24] at $912.0 \pm 1.0\ \text{\AA}$.

Kr xxIII (Si sequence)

Ground state $1s^22s^22p^63s^23p^2\ {}^3\text{P}_0$

Ionization energy $8\ 047\ 000\ \text{cm}^{-1}$ (997.7 eV)

Roberts *et al.* [24] observed the $3p^2\ {}^3\text{P}_1-{}^3\text{P}_2$, ${}^3\text{P}_0-{}^3\text{P}_1$, and ${}^3\text{P}_1-{}^1\text{D}_2$ magnetic-dipole transitions at $3840.9 \pm 0.3\ \text{\AA}$, $1461.8 \pm 0.2\ \text{\AA}$, and $853.8 \pm 1.0\ \text{\AA}$ in a tokamak discharge. For the ${}^3\text{P}_0-{}^3\text{P}_1$ line, Benjamin *et al.* [29] obtained the wavelength $1462.65 \pm 0.03\ \text{\AA}$ with the same tokamak.

Four lines of the $3p^2-3p3d$ array were identified by the TFR Group and Wyart [26] in the range of $116-145\ \text{\AA}$. More extensive and accurate measurements were made by Sugar *et al.* [30], who ascribed eleven lines to the above array measured with an uncertainty of $\pm 0.005\ \text{\AA}$. Their results are given here. Sugar *et al.* [30] revised the classification of $3p^2\ {}^3\text{P}_2-3p3d\ {}^1\text{P}_1$ in Ref. 26 as $3s^23p^2\ {}^3\text{P}_2-3s3p^3\ {}^3\text{S}_1$.

Kr xxIV (Al sequence)

Ground state $1s^22s^22p^63s^23p\ {}^2\text{P}_{1/2}$

Ionization energy $8\ 476\ 000\ \text{cm}^{-1}$ (1050.9 eV)

The $3s^23p-3s^23d$, $3s3p^2$ arrays were identified by Wyart and the TFR Group [21] and the TFR Group and Wyart [26] in a tokamak discharge and by Stewart *et al.* [31] in a Z-pinch plasma. These transitions, except for the $3s^23p\ {}^2\text{P}_{1/2}-3s3p^2\ {}^2\text{P}_{1/2}$ at $132.44 \pm 0.02\ \text{\AA}$, were reobserved by Sugar *et al.* [32] with an uncertainty of $\pm 0.01\ \text{\AA}$. An isoelectronic comparison of the measured wavelengths with Hartree-Fock calculations was made by them, and smoothed wavelengths were derived. We give these results. The smoothed wavelength corresponding to the $3s^23p\ {}^2\text{P}_{1/2}-3s3p^2\ {}^2\text{P}_{1/2}$ is $132.498\ \text{\AA}$, which is different by $0.06\ \text{\AA}$ from the value of the TFR Group and Wyart [26].

Three $3s^23p\ {}^2\text{P}^o-3s3p^2\ {}^4\text{P}$ intercombination transitions were identified by Jup  n *et al.* [33] with an uncertainty of $\pm 0.02\ \text{\AA}$ using a tokamak light source. The ${}^2\text{P}_{1/2}-{}^4\text{P}_{1/2}$ line at $242.56\ \text{\AA}$ is blended with the Mg-like intercombination transition $3s^2\ {}^1\text{S}_0-3s3p\ {}^3\text{P}_1$.

Kr xxV (Mg sequence)

Ground state $1s^22s^22p^63s^2\ {}^1\text{S}_0$

Ionization energy $9\ 287\ 000\ \text{cm}^{-1}$ (1151.4 eV)

Roberts *et al.* [24] identified the $3s3p\ {}^3\text{P}_1-{}^3\text{P}_2$ magnetic-dipole transition at $1277.1 \pm 1.0\ \text{\AA}$. The value calculated from the levels derived with E1 lines by Sugar *et al.* [34] is $1275.0\ \text{\AA}$.

The first observation of the $3s^2\ {}^1\text{S}_0-3s3p\ {}^1\text{P}_1$ transition was reported by Hinnov [35] at $159.0 \pm 0.5\ \text{\AA}$ using a tokamak discharge. Wyart and the TFR Group [21] observed 11 lines of the $3s^2-3s3p$, $3s3p-3s3d$, $3s3p-3p^2$ arrays in the range of $110-243\ \text{\AA}$. They also observed the $3s^2\ {}^1\text{S}_0-3s4p\ {}^1\text{P}_1$ line at $21.840 \pm 0.015\ \text{\AA}$. The TFR Group and Wyart [26] withdrew the identification of two lines in Ref. 21, the $3s3p\ {}^3\text{P}_{1,2}-3s3d\ {}^3\text{D}_2$ at $129.895\ \text{\AA}$ and $144.665\ \text{\AA}$. The $3s3p\ {}^3\text{P}_0-3s3d\ {}^3\text{D}_1$ line was identified by Stewart *et al.* [31] in a Z-pinch plasma. Sugar *et al.* [34] remeasured the $3s^2\ {}^1\text{S}_0-3s3p\ {}^1\text{P}_1$, $3s3p\ {}^3\text{P}_2-3p^2\ {}^3\text{P}_2$, and $3s3p\ ({}^3\text{P}_{0,2}, {}^1\text{P}_1)-3s3d\ ({}^3\text{D}_{1,3}, {}^1\text{D}_2)$ lines with an uncertainty of $\pm 0.005\ \text{\AA}$ in a tokamak discharge. They derived smoothed wavelengths, except for the $3s3p\ {}^3\text{P}_0-3s3d\ {}^3\text{D}_1$ transition, in an isoelectronic comparison with Dirac-Fock calculations.

Churilov *et al.* [36] analyzed the $3p3d-3d^2$ transitions from the spectrum observed by Stewart *et al.* [31] in the range of $129.3-246\ \text{\AA}$. They included data from Ref. 21. They identified $35\ n=3-3$ lines. Seven of them, comprising the $3s3p\ {}^3\text{P}_1-3s3d\ {}^3\text{D}_2$ line and six $3s3p-3p^2$ lines, were reobserved by Jup  n *et al.* [33], who ascribed the line at $129.420\ \text{\AA}$ to the $3s3p\ {}^3\text{P}_1-3s3d\ {}^3\text{D}_2$ transition. The uncertainty of their wavelengths is $\pm 0.02\ \text{\AA}$. The $3s3p\ {}^1\text{P}_1-3p^2\ {}^3\text{P}_2$ line at $217.03\ \text{\AA}$ has a deviation of $\pm 0.06\ \text{\AA}$ from the value calculated with the levels [34].

It should be noted that many wavelengths taken from Ref. 36, especially those of blended lines, exceed the stated uncertainty of $\pm 0.03\ \text{\AA}$, compared with wavelengths calculated from the level values adopted here.

Kr xxVI (Na sequence)

Ground state $1s^22s^22p^63s\ {}^2\text{S}_{1/2}$

Ionization energy $9\ 721\ 300\ \text{cm}^{-1}$ (1205.3 eV)

Hinnov [35] first identified the $3s-3p$ resonance doublet in a tokamak plasma. In addition to this doublet, Wyart and the TFR Group [21] measured 12 new lines, including the $3p-3d$, the $4f-5g$, and $n=3-4$ transitions. The uncertainties of the wavelengths above $100\ \text{\AA}$ and of those below $100\ \text{\AA}$ are estimated to be $\pm 0.015\ \text{\AA}$ and $\pm 0.03\ \text{\AA}$, respectively. Jup  n *et al.* [33] identified the line at $165.12 \pm 0.02\ \text{\AA}$ as the $3p\ {}^2\text{P}_{3/2}-3d\ {}^2\text{D}_{3/2}$ transition. An isoelectronic comparison of the measured wavelengths of the $3s-3p$, $3p-3d$, and $3d-4f$ doublets with Dirac-Fock calculations was made by Reader *et al.* [37] for Ar^{7+} to Xe^{43+} , and least squares adjusted (smoothed) wavelengths were derived. The overall uncertainty estimate is $\pm 0.007\ \text{\AA}$. We give these results here.

An extended analysis using a Z-pinch plasma was given by Stewart *et al.* [31] in the range of $15-221\ \text{\AA}$. They reobserved the above lines and identified the $n=4-5$, and $n=3-5$ transitions with an uncertainty of $\pm 0.03\ \text{\AA}$. Additional lines are taken from these results.

The inner-shell $2p-3s$ transitions were observed by Burkhalter *et al.* [38] in the range of $7.3-7.6\text{ \AA}$ with a Z-pinch plasma source. Two lines, $2p^63s\ ^2S_{1/2}-2p^53s\ ^2P_{1/2,3/2}$ at $7.322\pm0.003\text{ \AA}$ and $7.570\pm0.003\text{ \AA}$, are adopted here. The other 10 lines are not resolved.

Kr xxvii (Ne sequence)

Ground state $1s^22s^22p^6\ ^1S_0$

Ionization energy $23\ 616\ 000\text{ cm}^{-1}$ (2928 eV)

Stewart *et al.* [31] proposed identifications of the $n=3-3$ transitions with 14 lines measured in a Z-pinch plasma source. An extended analysis of the $2p^53s-2p^53p$ and $2p^53p-2p^53d$ transitions was made by Buchet *et al.* [39], who identified 28 lines of these transitions in a beam-foil experiment. The uncertainty of the wavelengths ranges from $\pm 0.05\text{ \AA}$ to 0.2 \AA . The lines at 147.51 \AA , 158.45 \AA , and 170.55 \AA are tentatively identified. The last is confirmed in an isoelectronic study by Nilsen and Scofield [40] but the first is given as 149.77 \AA . We adjusted the level values of the $2p^53p\ (^{1/2,3/2})_0$, $2p^53d\ (^{3/2,5/2})_2$, and $2p^53d\ (^{1/2,5/2})_2$ to $14\ 283\ 900\text{ cm}^{-1}$, $14\ 399\ 000\text{ cm}^{-1}$, and $14\ 858\ 300\text{ cm}^{-1}$, so as to get a better agreement with the measured wavelengths.

The $2s-3p$, $2p-3s$, and $3d$ transitions in the range of $6.3-7.6\text{ \AA}$ were observed by Burkhalter *et al.* [38] and Gordon *et al.* [41] in a Z-pinch plasma and a laser-produced plasma, respectively. The wavelengths with an uncertainty of $\pm 0.005\text{ \AA}$ are from Gordon *et al.* [41].

Kr xxviii (F sequence)

Ground state $1s^22s^22p^5\ ^2P_{3/2}^o$

Ionization energy $24\ 760\ 000\text{ cm}^{-1}$ (3070 eV)

The $2s^22p^5\ ^2P_{3/2,1/2}^o-2s2p^6\ ^2S_{1/2}$ transitions were identified by Wyart and the TFR Group [21] and reobserved by Dietrich *et al.* [42] using a Z-pinch plasma source. In addition to observing these lines at $52.594\pm0.020\text{ \AA}$ and $68.733\pm0.030\text{ \AA}$, in a tokamak plasma, Denne *et al.* [43] identified a line at $223.995\pm0.030\text{ \AA}$ as the $^2P_{3/2}^o-^2P_{1/2}^o$ magnetic-dipole transition in the ground configuration. We adopted their results.

Burkhalter *et al.* [38] observed the spectrum in the range of $6.1-7.2\text{ \AA}$ with a Z-pinch plasma and identified the $2p^5-2p^4$, $3s$, $3d$, $2s^22p^5-2s2p^53p$, and $2s2p^6-2p^63p$ transitions. We have changed the $2p^4$ parent term of the $2p^43s$ configuration to 3P_0 , 3P_1 , and 3P_2 for the lines at 7.123 \AA , 6.997 \AA , and 6.975 \AA , respectively based on our calculation of the percent composition of the levels with Cowan's code [44]. Concerning the $2p^5-2p^43d$ line at 6.449 \AA , we find no correspondence with a theoretical level.

Kr xxix (O sequence)

Ground state $1s^22s^22p^4\ ^3P_2$

Ionization energy $26\ 030\ 000\text{ cm}^{-1}$ (3227 eV)

Wyart and the TFR Group [21] identified three lines of the $2s^22p^4-2s2p^5$ array in a tokamak discharge. This array was augmented to seven lines by Dietrich *et al.* [42] using a Z-pinch plasma and to nine lines by Denne *et al.* [43] using a tokamak. The latter reference includes two magnetic-dipole transitions $2s^22p^4\ ^3P_2-^1D_2$ and $^3P_2-^3P_1$ at $190.515\text{ \AA}\pm0.03\text{ \AA}$ and $235.95\pm0.10\text{ \AA}$, respectively. We give the results of Denne *et al.* [43] with a measurement uncertainty of $\pm 0.03\text{ \AA}$, supplemented by the $2s^22p^4-2s2p^5\ ^1D_2-^1P_1^o$ transition at $53.977\pm0.015\text{ \AA}$ reported by Wyart and TFR Group [21] and the $^3P_1-^3P_0^o$ transition at $58.48\pm0.05\text{ \AA}$ by Dietrich *et al.* [42].

Kr xxx (N sequence)

Ground state $1s^22s^22p^3\ ^4S_{3/2}^o$

Ionization energy $27\ 270\ 000\text{ cm}^{-1}$ (3381 eV)

Denne *et al.* [43] identified the magnetic-dipole lines $2s^22p^3\ ^2S_{3/2}^o-^2D_{3/2,5/2}^o$ at $259.807\pm0.020\text{ \AA}$ and $205.247\pm0.025\text{ \AA}$ in a tokamak discharge. In addition, the $^4S_{3/2}^o-^2P_{1/2}^o$ line was tentatively identified at $160.90\pm0.10\text{ \AA}$. They also reported the three strong lines of the $2s^22p^3\ ^4S^o-2s2p^4\ ^4P$ multiplet and four weaker lines of this multiplet in the range of $54-111\text{ \AA}$ with an uncertainty varying from $\pm 0.025\text{ \AA}$ to $\pm 0.06\text{ \AA}$.

Kr xxxi (C sequence)

Ground state $1s^22s^22p^2\ ^3P_0$

Ionization energy $28\ 990\ 000\text{ cm}^{-1}$ (3594 eV)

The magnetic-dipole line, $2s^22p^2\ ^3P_0-^3P_1$ at $252.001\pm0.020\text{ \AA}$ and eight lines of the $2s^22p^2-2s2p^3$ array were identified by Denne *et al.* [43] in a tokamak plasma and measured with an uncertainty between $\pm 0.02\text{ \AA}$ and $\pm 0.05\text{ \AA}$. The line at $56.976\pm0.050\text{ \AA}$ is tentatively identified as the $2s^22p^2\ ^3P_1-2s2p^3\ ^3S^o$ transition. Beam-foil observations by Martin *et al.* [45] comprised four $2s^22p^2-2s2p^3$ transitions, including one new line, the $^3P_1-^3P_0^o$ transition at $64.14\pm0.05\text{ \AA}$. They also identified the $2s2p^3\ ^3P_1-2p^4\ ^3P_0$ transition at $79.45\pm0.05\text{ \AA}$.

Kr xxxii (B sequence)

Ground state $1s^22s^22p\ ^2P_{1/2}^o$

Ionization energy $30\ 330\ 000\text{ cm}^{-1}$ (3760 eV)

The $2s^22p\ ^2P_{1/2}^o-^2P_{3/2}^o$ magnetic-dipole line was identified at $203.021\pm0.020\text{ \AA}$ by Denne *et al.* [43] in a tokamak plasma, together with four lines of the $2s^22p-2s2p^2$ array. Two of them, the $^2P_{3/2}^o-^2P_{3/2}$ at $64.65\pm0.10\text{ \AA}$ and $^2P_{3/2}^o-^2D_{5/2}$ at $84.94\pm0.10\text{ \AA}$, are tentative identifications. Reobservation of

this array by Martin *et al.* [45] in a beam-foil experiment produced five lines of this array with uncertainties of $\pm 0.05 \text{ \AA}$ to $\pm 0.20 \text{ \AA}$. Three of them, not found by Denne *et al.* [43], are adopted here. Martin *et al.* [45] identified the lines at $78.90 \pm 0.20 \text{ \AA}$ and $93.75 \pm 0.20 \text{ \AA}$ as the $2s2p^2 - 2p^3$ transitions.

Kr xxxiii (Be sequence)

Ground state $1s^2 2s^2 \ ^1S_0$

Ionization energy $31\ 990\ 000 \text{ cm}^{-1}$ (3966 eV)

The intercombination line $2s^2 \ ^1S_0 - 2s2p \ ^3P_1^o$ was measured by Dietrich *et al.* [46] at $169.9 \pm 0.5 \text{ \AA}$ in a beam-foil spectrum and by Denne *et al.* [43] at $169.845 \pm 0.025 \text{ \AA}$ in a tokamak discharge. Denne *et al.* [43] also identified the magnetic-dipole transition $2s2p \ ^3P_1^o - ^3P_2^o$ with a weak and blended line at $235.48 \pm 0.05 \text{ \AA}$, and the resonance line $2s^2 \ ^1S_0 - 2s2p \ ^1P_1^o$ at $72.756 \pm 0.020 \text{ \AA}$. Their results are given here. Nine lines of the $2s2p - 2p^2$ transitions were obtained by Martin *et al.* [45] in a beam-foil experiment. The uncertainties of the wavelengths are estimated to be between $\pm 0.05 \text{ \AA}$ and $\pm 0.20 \text{ \AA}$.

Kr xxxiv (Li sequence)

Ground state $1s^2 2s \ ^2S_{1/2}$

Ionization energy $33\ 137\ 600 \text{ cm}^{-1}$ (4108.54 eV)

The resonance doublet $2s \ ^2S_{1/2} - 2p \ ^2P_{3/2,1/2}^o$ was observed by Dietrich *et al.* [46] and Martin *et al.* [45] in beam-foil spectra and by Denne *et al.* [43] in a tokamak plasma. The wavelengths of $91.049 \pm 0.025 \text{ \AA}$ and $174.036 \pm 0.026 \text{ \AA}$ are from Denne *et al.* [43].

Vainshtein and Safronova [47] calculated energy levels of the $1s^2 nl$ configurations with $n = 2 - 5$, and $l = s, p$, and d . Their results are adjusted to the $1s^2 2p \ ^2P_{1/2,3/2}^o$ experimental levels of Denne *et al.* [43] by adding 1360 cm^{-1} . They also calculated wavelengths of the $1s^2 2s - 1s2s2p$, $1s^2 2p - 1s2p^2$, $1s^2 2p - 1s2s^2$ transitions. We use their results to derive these autoionizing energy levels. All the wavelengths given here are derived from the adjusted energy levels from Ref. 47.

Kr xxxv (He sequence)

Ground state $1s^2 \ ^1S_0$

Ionization energy $139\ 511\ 000 \text{ cm}^{-1}$ (17297.16 eV)

Four beam-foil experiments were reported. Gould and Marrus [48] gave the $1s^2 \ ^1S_0 - 1s2s \ ^3S_1$ transition. The $1s^2 \ ^1S_0 - 1s2p \ ^1P_1^o$ and $^3P_{1,2}^o$ transitions were identified by Briand *et al.* [49] at 0.94545 \AA , 0.95198 \AA , and 0.94708 \AA with an uncertainty of $\pm 0.00010 \text{ \AA}$. Indelicato *et al.* [50] gave the

wavelengths 0.94533 \AA and 0.95176 \AA for the first two transitions. Martin *et al.* [45] observed the $1s2s \ ^3S_1 - 1s2p \ ^3P_{0,2}^o$ lines at $279.80 \pm 0.20 \text{ \AA}$ and $111.11 \pm 0.03 \text{ \AA}$. We adopt the results of Refs. 45 and 50 in combination with calculated values for the 1S terms by Drake [51,52].

Drake [51,52] calculated values for the energy levels of the configurations $1snl$ with $n = 2 - 3$ and $l = s, p$, and d . An improved calculation of $1s2p \ ^1,3P^o$ levels by Cheng *et al.* [53] shows that Drake's [51,52] energy levels should be increased by 3600 cm^{-1} . The observed levels [50] are about 4100 cm^{-1} still higher than this but their uncertainties are about the same. We therefore estimate the uncertainties of Drake's [51,52] corrected values to be $\pm 4000 \text{ cm}^{-1}$. For the levels with $n = 4 - 5$, values calculated by Vainshtein and Safronova [47] have been tabulated after increasing them by $9\ 000 \text{ cm}^{-1}$ to correspond with the corrected values of Drake [51,52] for $n = 2, 3$. Vainshtein and Safronova [47] also calculated wavelengths of the transitions $1s2s - 2s2p$, $1s2p - 2s^2$, and $1s2p - 2p^2$, which we have compiled.

The ionization energy is taken from the calculations of Cheng *et al.* [53].

Kr xxxvi (H sequence)

Ground state $1s \ ^2S_{1/2}$

Ionization energy $144\ 665\ 280 \text{ cm}^{-1}$ (17 936.21 eV)

Tavernier *et al.* [54] observed the $1s \ ^2S_{1/2} - 2p \ ^2P_{3/2}^o$ transition at $0.91779 \pm 0.00004 \text{ \AA}$ in a beam-foil experiment.

We have tabulated the wavelengths calculated from the theoretical energy levels of Johnson and Soff [55] for the $n = 2$ shell whose estimated uncertainty is $\pm 100 \text{ cm}^{-1}$. Their energy differences are in close agreement with those of Mohr [56]. The binding energies for the levels with $n = 2 - 5$ have been calculated by Erickson [57]. We subtract Erickson's values from the binding energy of the ground state calculated by Johnson and Soff [55] to obtain corrected values for Erickson's levels. Erickson's value for $2s$ then differs from that of Johnson and Soff by 880 cm^{-1} . Assuming that this is due to the omission of the QED correction by Erickson, and that QED scales as $1/n^3$ we estimate the error in $3s$ as $(2/3)^3 \times 880 \text{ cm}^{-1}$.

3. Explanation of Tables of Spectroscopic Data

Kr v, Kr xxxvi, etc.

According to spectroscopic convention, Kr I indicates the first spectrum, i.e., the spectrum of the neutral atom; Kr II denotes the second spectrum, belonging to the singly ionized atom; and so on.

H-Sequence, C-Sequence, etc.

Indicates that the respective Kr ion has the same number of electrons as neutral hydrogen, neutral carbon, etc.

IP

Principal ionization energy of the tabulated ions in cm^{-1} (eV).

 $\lambda(\text{\AA})$

Wavelength in Å units (10^{-8}cm).

C,T,P

Superscripts to the right of a wavelength value have the following meanings:

- ^C wavelength calculated from energy level data using the Ritz combination principle.
- ^T wavelength tentatively identified.
- ^P wavelength predicted along an isoelectronic sequence.

Classification

Standard spectroscopic designation for lower (first) and upper levels generating the spectral lines; electronic configurations followed by the term in LS -, jj - or jl -coupling notation. The superscript “ \circ ” on the term indicates odd parity. A term enclosed in parentheses refers to an intermediate state. Where only the total angular momentum J is given in successive listings, the preceding configuration and term labels apply.

Energy Levels

Level values (in cm^{-1}) for lower (first) and upper (second) level of the transition. A question mark “?” after

the level value indicates level was derived from a tentatively classified line. Calculated level values are given in square brackets.

Int.

Approximate intensity of a spectral line, generally visually estimated from the blackness (or density) of the line on photographic plates.

Type

Mode of decay of the atom: E2, E3, ..., M1, M2, M3, ... No entry means electric-dipole transition (E1).

A

Radiative transition probability in s^{-1} . $1.23+11$ means 1.23×10^{11} .

References

Reference sources for the data. The numbers are keyed to the bibliographic listing following the tables. When several references are listed, they are distinguished by superscripts on the numbers as follows:

- ^o reference from which the quoted wavelength is taken.
- * reference for the adopted transition probability.
- ^Δ reference from which the estimated intensity is taken.

4. Spectroscopic Data for Kr v through Kr xxxvi

Kr v (Ge sequence)

$\lambda(\text{\AA})$	Classification		Energy Levels (cm^{-1})		Int.	Type	$A(\text{s}^{-1})$	References
909.63	$4s^24p^2$	1D_2	$4s4p^3$	$^3D_1^\circ$	19 723	129 658	7	2
908.63		2		2	19 723	129 779	7	2
898.53		2		3	19 723	131 016	6	2
819.25	$4s^24p^2$	3P_2	$4s4p^3$	$^3D_1^\circ$	7 595	129 658	10	2
818.43		2		2	7 595	129 779	9	2
810.23		2		3	7 595	131 016	10	2
794.19		1		1	3 743	129 658	10	2
793.43		1		2	3 743	129 779	10	2
771.25		0		1	0	129 658	10	2
777.82	$4s^24p^2$	1D_2	$4s4p^3$	$^3P_1^\circ$	19 723	148 287	3	2
775.53		2		2	19 723	148 668	6	2
710.77	$4s^24p^2$	3P_2	$4s4p^3$	$^3P_1^\circ$	7 595	148 287	10	2
708.85		2		2	7 595	148 668	10	2
693.57		1		0	3 743	147 925	10	2
691.84		1		1	3 743	148 287	10	2
690.01		1		2	3 743	148 668	10	2
674.36		0		1	0	148 287	10	2
696.07	$4s^24p^2$	1D_2	$4s4p^3$	$^1D_2^\circ$	19 723	163 387	9	2
645.85	$4s^24p^2$	1S_0	$4s4p^3$	$^1P_1^\circ$	39 204	194 041	10	2
641.88	$4s^24p^2$	3P_2	$4s4p^3$	$^1D_2^\circ$	7 595	163 387	5	2

Kr v (Ge sequence) — Continued

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
573.67	$4s^24p^2$	1D_2	$4s4p^3$	$^1P_1^o$	19 723	194 041	10	2
563.49	$4s^24p^2$	3P_2	$4s4p^3$	$^3S_1^o$	7 595	185 064	10	2
551.51		1		1	3 743	185 064	10	2
540.35		0		1	0	185 064	10	2
536.34	$4s^24p^2$	3P_2	$4s4p^3$	$^1P_1^o$	7 595	194 041	10	2
525.49		1		1	3 743	194 041	4	2
515.35		0		1	0	194 041	6	2
521.87	$4s^24p^2$	1D_2	$4s^24p4d$	$^3P_2^o$	19 723	211 337	3	2
507.23	$4s^24p^2$	1D_2	$4s^24p4d$	$^1D_2^o$	19 723	216 875	2	2
503.73	$4s^24p^2$	1S_0	$4s^24p4d$	$^1P_1^o$	39 204	237 721	7	2
502.45	$4s^24p^2$	1D_2	$4s^24p4d$	$^3D_1^o$	19 723	218 747	2	2
500.84		2		3	19 723	219 382	2	2
499.75		2		2	19 723	219 823	2	2
490.81	$4s^24p^2$	3P_2	$4s^24p4d$	$^3P_2^o$	7 595	211 337	7	2
484.64		2		1	7 595	213 933	3	2
481.72		1		2	3 743	211 337	6	2
475.75		1		1	3 743	213 933	6	2
470.20		1		0	3 743	216 420	5	2
467.45		0		1	0	213 933	6	2
477.82	$4s^24p^2$	3P_2	$4s^24p4d$	$^1D_2^o$	7 595	216 875	5	2
469.20		1		2	3 743	216 875	2	2
473.59	$4s^24p^2$	3P_2	$4s^24p4d$	$^3D_1^o$	7 595	218 747	5	2
472.19		2		3	7 595	219 382	7	2
471.21		2		2	7 595	219 823	5	2
465.11		1		1	3 743	218 747	6	2
462.77		1		2	3 743	219 823	7	2
457.15		0		1	0	218 747	4	2
466.43	$4s^24p^2$	1D_2	$4s^24p4d$	$^1F_3^o$	19 723	234 121	7	2
441.44	$4s^24p^2$	3P_2	$4s^24p4d$	$^1F_3^o$	7 595	234 121	2	2
434.55	$4s^24p^2$	3P_2	$4s^24p4d$	$^1P_1^o$	7 595	237 721	4	2

Kr vi (Ga sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
3394.7	$4s^26h$	$^2H^o$	$4s^27i$	2I				9
3381.7	$4s^26g$	2G	$4s^27h$	$^2H^o$				9
2051.06	$4s^25s$	$^2S_{1/2}$	$4s^25p$	$^2P_{1/2}^o$	275 380	324 120	100	6
1950.20		$1/2$		$3/2$	275 380	326 657	50	6
1817.45	$4s^24d$	$^2D_{5/2}$	$4p^3$	$^2D_{5/2}^o$	223 040	278 062	8	6
1061.069	$4s^24p^2$	$^2P_{3/2}$	$4p^3$	$^2D_{5/2}^o$	183 817	278 062	75	6
1045.23		$1/2$		$3/2$	180 399	276 011	30	6
1053.3	$4s^24p^2$	$^2P_{3/2}$	$4p^3$	$^4S_{3/2}^o$	183 817	278 787		5
1015.77		$1/2$		$3/2$	180 399	278 787	11	6

Kr vi (Ga sequence) — Continued

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
1011.14	$4s^2 5s$	$^2S_{1/2}$	$4s 4p(^3P^o)4d$	$^2P_{3/2}^o$	275 380	374 279	8		6
1002.8	$4s^2 4p$	$^2P_{3/2}^o$	$4s 4p^2$	$^4P_{1/2}$	8 110	107 836			5
970.2		$^3/2$		$^3/2$	8 110	111 193			5
931.4		$^3/2$		$^5/2$	8 110	115 479			5
927.4		$^1/2$		$^1/2$	0	107 836			5
899.4		$^1/2$		$^3/2$	0	111 193			5
980.411	$4s^2 4d$	$^2D_{3/2}$	$4s^2 5p$	$^2P_{1/2}^o$	222 122	324 120	30		6
965.093		$^5/2$		$^3/2$	223 040	326 657	20		6
956.615		$^3/2$		$^3/2$	222 122	326 657	12		6
944.05	$4s 4p^2$	$^2S_{1/2}$	$4p^3$	$^2D_{3/2}$	170 084	276 011	15		6
919.934	$4s 4p^2$	$^2S_{1/2}$	$4p^3$	$^4S_{3/2}^o$	170 084	278 787	9		6
918.14	$4s^2 4d$	$^2D_{5/2}$	$4s 4p(^3P^o)4d$	$^4P_{5/2}^o$	223 040	331 956	8		6
910.47		$^3/2$		$^5/2$	222 122	331 956	3		6
868.96	$4s^2 4d$	$^2D_{5/2}$	$4s 4p(^3P^o)4d$	$^4D_{5/2}^o$	223 040	338 119	9		6
859.65		$^3/2$		$^5/2$	222 122	338 447	3		6
834.17	$4s 4p^2$	$^2P_{3/2}^o$	$4p^3$	$^2P_{1/2}^o$	183 817	303 697			6
822.8		$^3/2$		$^3/2$	183 817	305 385			5
810.65		$^1/2$		$^1/2$	180 339	303 697			6
799.8		$^1/2$		$^3/2$	180 339	305 385			5
830.11	$4s^2 4d$	$^2D_{5/2}$	$4s 4p(^3P^o)4d$	$^2D_{5/2}^o$	223 040	343 505	7		6
825.98		$^3/2$		$^3/2$	222 122	343 190	5		6
823.84		$^3/2$		$^5/2$	222 122	343 505	3		6
780.92	$4s^2 5s$	$^2S_{1/2}$	$4s 4p(^3P^o)5s$	$^2P_{1/2}^o$	275 380	403 436	5		6
751.10		$^1/2$		$^3/2$	275 380	408 520	2		6
766.72	$4s^2 4d$	$^2D_{3/2}$	$4s 4p(^3P^o)4d$	$^2F_{5/2}^o$	222 122	352 547	6		6
735.316		$^5/2$		$^7/2$	223 040	359 035	10		6
750.277	$4s 4p^2$	$^2D_{5/2}$	$4p^3$	$^2D_{3/2}^o$	142 727	276 011	30		6
744.3		$^3/2$		$^3/2$	141 672	276 011	5		5
738.9		$^5/2$		$^5/2$	142 727	278 062			5
733.2		$^3/2$		$^5/2$	141 672	278 062			5
748.70	$4s^2 4p$	$^2P_{3/2}^o$	$4s 4p^2$	$^2D_{3/2}$	8 110	141 672	9		4
742.83		$^3/2$		$^5/2$	8 110	142 727			4
705.85		$^1/2$		$^3/2$	0	141 672	8		4
739.096	$4s 4p^2$	$^2S_{1/2}$	$4p^3$	$^2P_{3/2}^o$	170 084	305 385	20		6
735.1	$4s 4p^2$	$^2D_{5/2}$	$4p^3$	$^4S_{3/2}^o$	142 727	278 787			5
729.4		$^3/2$		$^3/2$	141 672	278 787			5
700.06	$4s 4p^2$	$^2P_{3/2}^o$	$4s^2 5p$	$^2P_{3/2}^o$	183 817	326 657	3		6
675.033	$4s 4p^2$	$^2P_{3/2}^o$	$4s 4p(^3P^o)4d$	$^4P_{5/2}^o$	183 817	331 956	10		6
657.20	$4s^2 4d$	$^2D_{3/2}$	$4s 4p(^3P^o)4d$	$^2P_{3/2}^o$	222 122	374 279	3		6
638.68	$4s 4p^2$	$^2S_{1/2}$	$4s^2 5p$	$^2P_{3/2}^o$	170 084	326 657	5		6
626.220	$4s 4p^2$	$^2P_{3/2}^o$	$4s 4p(^3P^o)4d$	$^2D_{5/2}^o$	183 817	343 505	10		6
614.05		$^1/2$		$^3/2$	180 339	343 190	9		6
622.8	$4s 4p^2$	$^4P_{5/2}$	$4p^3$	$^2D_{3/2}^o$	115 479	276 011			5
615.07		$^5/2$		$^5/2$	115 479	278 062	10		6
606.726		$^3/2$		$^3/2$	111 193	276 011	20		6
599.26		$^3/2$		$^5/2$	111 193	278 062	1		6
594.618		$^1/2$		$^3/2$	107 836	276 011	12		6

Kr VI (Ga sequence) — Continued

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	A (s ⁻¹)	References
617.379	4s ² 4p	² P _{3/2}	4s 4p ²	² S _{1/2}	8 110	170 084	9	6
587.94		_{1/2}		_{1/2}	0	170 084	12	6
617.18	4s 4p ²	² D _{3/2}	4p ³	² P _{1/2} ^o	141 672	303 697	150bl	6
614.9		_{5/2}		_{3/2}	142 727	305 385		5
610.828		_{3/2}		_{3/2}	141 672	305 385	5	6
612.4	4s 4p ²	⁴ P _{5/2}	4p ³	⁴ S _{3/2}	115 479	278 787		5
596.7		_{3/2}		_{3/2}	111 193	278 787		5
584.958		_{1/2}		_{3/2}	107 836	278 787	11	6
599.79	4s ² 5s	² S _{1/2}	4s 4p(¹ P ^o)5s	² P _{1/2} ^o	275 380	442 106	9	6
595.970		_{1/2}		_{3/2}	275 380	443 176	9	6
593.56	4s ² 4d	² D _{3/2}	4s 4p(¹ P ^o)4d	² D _{3/2} ^o	222 122	390 595	4	6
592.28		_{5/2}		_{5/2}	223 040	391 878	4	6
592.68	4s 4p ²	² P _{3/2}	4s 4p(³ P ^o)4d	² F _{5/2} ^o	183 817	352 547	2	6
588.31	4s ² 4d	² D _{5/2}	4s 4p(¹ P ^o)4d	² P _{3/2} ^o	223 040	393 018	9	6
585.14		_{3/2}		_{3/2}	222 122	393 018	4	6
580.63	4s ² 4p	² P _{3/2} ^o	4s 4p ²	² P _{1/2}	8 110	180 339	6	4
569.13		_{3/2}		_{3/2}	8 110	183 817	9	4
554.51		_{1/2}		_{1/2}	0	180 339	8	4
544.02		_{1/2}		_{3/2}	0	183 817	6	4
577.68	4s 4p ²	² S _{1/2}	4s 4p(³ P ^o)4d	² D _{3/2} ^o	170 084	343 190	6	6
569.354	4s ² 4d	² D _{5/2}	4s 4p(¹ P ^o)4d	² F _{7/2} ^o	223 040	398 678	11	6
563.44		_{3/2}		_{5/2}	222 122	399 599	7	6
548.107	4s 4p ²	² D _{3/2}	4s ² 5p	² P _{1/2}	141 672	324 120	10	6
543.689		_{5/2}		_{3/2}	142 727	326 657	10	6
540.587		_{3/2}		_{3/2}	141 672	326 657	4	6
528.457	4s 4p ²	² D _{5/2}	4s 4p(³ P ^o)4d	⁴ P _{3/2}	142 727	331 956	5	6
525.04	4s 4p ²	² P _{3/2}	4s 4p(³ P ^o)4d	² P _{3/2} ^o	183 817	374 279	6	6
516.96		_{3/2}		_{1/2}	183 817	377 255	1	6
507.82		_{1/2}		_{1/2}	180 339	377 255	6	6
522.30	4s 4p ²	² D _{3/2}	4s 4p(³ P ^o)4d	⁴ D _{3/2}	141 672	333 133	2	6
511.79		_{5/2}		_{7/2}	142 727	338 119	1	6
498.061	4s 4p ²	² D _{5/2}	4s 4p(³ P ^o)4d	² D _{5/2} ^o	142 727	343 505	9	6
496.237		_{3/2}		_{3/2}	141 672	343 190	8	6
495.46		_{3/2}		_{5/2}	141 672	343 505	7	6
489.738	4s 4p ²	² S _{1/2}	4s 4p(³ P ^o)4d	² P _{3/2} ^o	170 084	374 279	7	6
482.702		_{1/2}		_{1/2}	170 084	377 255	3	6
480.63	4s 4p ²	² P _{3/2}	4s 4p(¹ P ^o)4d	² D _{5/2} ^o	183 817	391 878	2	6
475.62		_{1/2}		_{3/2}	180 339	390 595	8	6
478.016	4s 4p ²	² P _{3/2}	4s 4p(¹ P ^o)4d	² P _{3/2} ^o	183 817	393 018	7	6
470.191		_{1/2}		_{3/2}	180 339	393 018	5	6
474.209	4s 4p ²	² D _{3/2}	4s 4p(³ P ^o)4d	² F _{5/2} ^o	141 672	352 547	7	6
462.31		_{5/2}		_{7/2}	142 727	359 035	8	6
467.25	4s ² 4p	² P _{3/2} ^o	4s ² 4d	² D _{3/2}	8 110	222 122	6	4
465.27		_{3/2}		_{5/2}	8 110	223 040	9	4
450.20		_{1/2}		_{3/2}	0	222 122	8	4

Kr VI (Ga sequence) — Continued

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	A (s ⁻¹)	References
461.94	$4s\ 4p^2$	${}^4P_{5/2}$	$4s\ 4p({}^3P^o)4d$	${}^4P_{5/2}^o$	115 479	331 956	4		6
452.972		${}^3/2$		${}^3/2$	111 193	331 956	7		6
448.668		${}^5/2$		${}^3/2$	115 479	338 364	5		6
440.840		${}^3/2$		${}^1/2$	111 193	338 032	5		6
440.192		${}^3/2$		${}^3/2$	111 193	338 364	5		6
433.79		${}^1/2$		${}^3/2$	107 836	338 364	1		6
459.47	$4s\ 4p^2$	${}^4P_{5/2}$	$4s\ 4p({}^3P^o)4d$	${}^4D_{5/2}^o$	115 479	333 133	2bl		6
450.581		${}^3/2$		${}^3/2$	111 193	333 133	6		6
449.15		${}^5/2$		${}^7/2$	115 479	338 119	7		6
448.95		${}^3/2$		${}^1/2$	111 193	333 936	2bl		6
448.502		${}^5/2$		${}^5/2$	115 479	338 447	4		6
443.858		${}^1/2$		${}^3/2$	107 836	333 133	6		6
442.28		${}^1/2$		${}^1/2$	107 836	333 936	6		6
440.038		${}^3/2$		${}^5/2$	111 193	338 447	2		6
445.0	$4s\ 4p^2$	${}^2P_{3/2}$	$4s\ 4p({}^3P^o)5s$	${}^2P_{3/2}^o$	183 817	408 520	1		6
430.46	$4s\ 4p^2$	${}^4P_{3/2}$	$4s\ 4p({}^3P^o)4d$	${}^2D_{5/2}^o$	111 193	343 505	4		6
424.91		${}^1/2$		${}^3/2$	107 836	343 190	4		6
428.56	$4s\ 4p^2$	${}^2S_{1/2}$	$4s\ 4p({}^3P^o)5s$	${}^2P_{1/2}^o$	170 084	403 436	6		6
419.42		${}^1/2$		${}^3/2$	170 084	408 520	6		6
410.59	$4s\ 4p^2$	${}^4P_{5/2}$	$4s\ 4p({}^3P^o)4d$	${}^2F_{7/2}^o$	115 479	359 035	4		6
403.43	$4s\ 4p^2$	${}^2D_{5/2}$	$4s\ 4p({}^1P^o)4d$	${}^2D_{3/2}^o$	142 727	390 595	2		6
399.54	$4s\ 4p^2$	${}^2D_{5/2}$	$4s\ 4p({}^1P^o)4d$	${}^2P_{3/2}^o$	142 727	393 018	2		6
390.70	$4s\ 4p^2$	${}^2D_{5/2}$	$4s\ 4p({}^1P^o)4d$	${}^2F_{7/2}^o$	142 727	398 678	6		6
389.29		${}^5/2$		${}^5/2$	142 727	399 599	2		6
387.72		${}^3/2$		${}^5/2$	141 672	399 599	4		6
387.17	$4s\ 4p^2$	${}^2P_{3/2}$	$4s\ 4p({}^1P^o)5s$	${}^2P_{1/2}^o$	183 817	442 106	4		6
382.01		${}^1/2$		${}^1/2$	180 339	442 106	6		6
380.48		${}^1/2$		${}^3/2$	180 339	443 176	2		6
382.01	$4s\ 4p^2$	${}^2D_{3/2}$	$4s\ 4p({}^3P^o)5s$	${}^2P_{1/2}^o$	141 672	403 436	6		6
376.23		${}^5/2$		${}^3/2$	142 727	408 520	6		6
374.74		${}^3/2$		${}^3/2$	141 672	408 520	4		6
374.2	$4s\ 2p$	${}^2P_{3/2}^o$	$4s\ 2s$	${}^2S_{1/2}$	8 110	275 380			5
363.2		${}^1/2$		${}^1/2$	0	275 380			5
366.17	$4s\ 4p^2$	${}^2S_{1/2}$	$4s\ 4p({}^1P^o)5s$	${}^2P_{3/2}^o$	170 084	443 176	4		6
357.99	$4s\ 4p^2$	${}^4P_{5/2}$	$4s\ 4p({}^3P^o)5s$	${}^4P_{3/2}^o$	115 479	394 817	2		6
351.93		${}^5/2$		${}^5/2$	115 479	399 630	6bl		6
348.45		${}^1/2$		${}^3/2$	107 836	394 817	1		6
346.69		${}^3/2$		${}^5/2$	111 193	399 630	4		6
332.83	$4s\ 4p^2$	${}^2D_{5/2}$	$4s\ 4p({}^1P^o)5s$	${}^2P_{3/2}^o$	142 727	443 176	6		6
332.83		${}^3/2$		${}^1/2$	141 672	442 106	6		6
331.65		${}^3/2$		${}^3/2$	141 672	443 176	1		6

Kr VII (Zn sequence)

λ (Å)		Classification		Energy Levels (cm ⁻¹)		Int.	Type	A (s ⁻¹)	References
2076.3	4s 4f	³ F ₂	4s 5d	³ D ₁	530 380	578 520			14
2073.3		3		2	530 550	578 770			14
2068.3		4		3	530 820	579 150			14
2056.8		3		3	530 550	579 150			14
2049.8		2		3	530 380	579 150			14
1985.5	4s 5s	¹ S ₀	4s 5p	¹ P ₁ ^o	447 400	497 760			14
1847.5 ^T	4s 5s	³ S ₁	4s 5p	³ P ₀ ^o	438 643.9	492 810			14
1832.5 ^T		1		1	438 643.9	493 250			14
1756.36		1		2	438 643.9	495 578.4	10		12°, 14
1202.7	4s 5p	³ P ₂ ^o	4s 5d	³ D ₂	495 578.4	578 770			14
1197.1		2		3	495 578.4	579 150			14
1172.8		1		1	493 250	578 520			14
1169.3		1		2	493 250	578 770			14
1166.6		0		1	492 810	578 520			14
1168.8	4s 5p	¹ P ₁ ^o	4s 5d	¹ D ₂	497 760	583 320			14
960.638	4s 4p	¹ P ₁ ^o	4p ²	³ P ₀	170 835.0	274 931.7	5		11
920.983		1		1	170 835.0	279 414.5	5		11
852.120		1		2	170 835.0	288 190.2	5		11
918.446	4s 4p	¹ P ₁ ^o	4p ²	¹ D ₂	170 835.0	279 714.8	60		11
845.5	4s 4d	¹ D ₂	4s 5p	¹ P ₁ ^o	379 488.3	497 760			14
832.682	4s ²	¹ S ₀	4s 4p	³ P ₁ ^o	0	120 094.8	9		11
700.1	4s 4d	³ D ₁	4s 5p	³ P ₀ ^o	349 973.1	492 810			14
700.1		2		1	350 416.8	493 250			14
697.9		1		1	349 973.1	493 250			14
692.22		3		2	351 116.2	495 578.4	10		12°, 14
688.89		2		2	350 416.8	495 578.4	10		12°, 14
686.76		1		2	349 973.1	495 578.4	1		12
662.43	4s 4p	¹ P ₁ ^o	4p ²	¹ S ₀	170 835.0	321 794	10		12
654.189	4s 4p	³ P ₂ ^o	4p ²	³ P ₁	126 553.0	279 414.5	50		11
645.847		1		0	120 094.8	274 931.7	30		11
627.668		1		1	120 094.8	279 414.5	30		11
618.664		2		2	126 553.0	288 190.2	40		11
617.189		0		1	117 389.6	279 414.5	30		11
594.899		1		2	120 094.8	288 190.2	30		11
652.905	4s 4p	³ P ₂ ^o	4p ²	¹ D ₂	126 553.0	279 714.8	5		11
626.486		1		2	120 094.8	279 714.8	4		11
585.361	4s ²	¹ S ₀	4s 4p	¹ P ₁ ^o	0	170 835.0	15		11
558.221	4s 4p	¹ P ₁ ^o	4s 4d	³ D ₁	170 835.0	349 973.1	4		11
556.855		1		2	170 835.0	350 416.8	4		11
557.3	4s 4d	³ D ₃	4s 4f	³ F ₃ ^o	351 116.2	530 550			14
556.5		3		4	351 116.2	530 820			14
555.2		2		3	350 416.8	530 550			14
554.3		1		2	349 973.1	530 380			14
487.4	4p ²	³ P ₂	4s 5p	³ P ₁ ^o	288 190.2	493 250			13
482.19		2		2	288 190.2	495 578.4	2		12
462.63		1		2	279 414.5	495 578.4	3		12°, 13
457.6		0		1	274 931.7	493 250			13
479.264	4s 4p	¹ P ₁ ^o	4s 4d	¹ D ₂	170 835.0	379 488.3	25		11

Kr VII (Zn sequence) — Continued

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
458.5	$4p^2$	1D_2	$4s5p$	$^1P_1^o$	279 714.8	497 760			13
447.606	$4s4p$	$^3P_2^o$	$4s4d$	3D_1	126 553.0	349 973.1	3		11
446.700		2		2	126 553.0	350 416.8	8		11
445.309		2		3	126 553.0	351 116.2	20		11
436.018		1		1	120 094.8	349 973.1	8		11
434.140		1		2	120 094.8	350 416.8	15		11
429.98		0		1	117 389.6	349 973.1	4		12
385.51	$4s4p$	$^3P_1^o$	$4s4d$	1D_2	120 094.8	379 488.3	4		12
362.0	$4s4p$	$^1P_1^o$	$4s5s$	1S_0	170 835.0	447 400			13
320.41	$4s4p$	$^3P_2^o$	$4s5s$	3S_1	126 553.0	438 643.9	2		12
313.92		1		1	120 094.8	438 643.9	3		12
311.26		0		1	117 389.6	438 643.9	1		12
221.4	$4s4p$	$^3P_2^o$	$4s5d$	3D_2	126 553.0	578 770			13
200.9	$4s^2$	1S_0	$4s5p$	$^1P_1^o$	0	497 760			13

Kr VIII (Cu sequence)

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
6065.5	$3d^{10}9l$	2L		$3d^{10}10m$	$^2M^o$	927 985	944 467		9
6056.3	$3d^{10}9k$	$^2K^o$		$3d^{10}10l$	2L	927 948	944 456		9
5848.8 ^T	$3d^{10}7s$	$^2S_{1/2}$		$3d^{10}7p$	$^2P_{3/2}^o$	796 490	813 577		9
4667.9	$3d^{10}10m$	$^2M^o$		$3d^{10}12n$	2N	944 467	965 884		9
4338.1	$3d^{10}8k$	$^2K^o$		$3d^{10}9l$	2L	904 940	927 985		9
4337.7	$3d^{10}8i$	2I		$3d^{10}9k$	$^2K^o$	904 901	927 948		9
4332.7	$3d^{10}8h$	$^2H^o$		$3d^{10}9i$	2I				9
4299.5	$3d^{10}8g$	2G		$3d^{10}9h$	$^2H^o$				9
3929.2	$3d^{10}8f$	$^2F^o$		$3d^{10}9g$	2G				9
3770.7	$3d^{10}7d$	$^2D_{3/2}$		$3d^{10}8p$	$^2P_{1/2}^o$	840 501	867 014		9
3702.9 ^T		5/2			3/2	840 686	867 694		9
3677.8 ^T		3/2			3/2	840 501	867 694		9
3759.0	$3d^{10}6f$	$^2F_{5/2}^o$		$3d^{10}7d$	$^2D_{3/2}$	813 913	840 501		9
3727.4		7/2			5/2	813 865	840 686		9
3712.7	$3d^{10}7d$	$^2D_{5/2}$		$3d^{10}7f$	$^2F_{7/2}^o$	840 686	867 613		9
3710.5		5/2			5/2	840 686	867 633		9
3684.1		3/2			5/2	840 501	867 633		9
3590.0	$3d^{10}8p$	$^2P_{3/2}^o$		$3d^{10}9s$	$^2S_{1/2}$	867 694	895 541		9
3506.2		1/2			1/2	867 014	895 541		9
3558.8 ^T	$3d^{10}6s$	$^2S_{1/2}$		$3d^{10}6p$	$^2P_{1/2}^o$	692 482	720 565		9
3337.4		1/2			3/2	692 482	722 429		9
3486.9	$3d^{10}9l$	2L		$3d^{10}11m$	$^2M^o$	927 985	956 656		9
3483.5	$3d^{10}9k$	$^2K^o$		$3d^{10}11l$	2L	927 948	956 647		9

Kr VIII (Cu sequence) — Continued

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	A (s ⁻¹)	References
3189.4	$3d^{10}7g$	2G	$3d^{10}8f$	$^2F^o$				9
2973.5	$3d^{10}7i$	2I	$3d^{10}8k$	$^2K^o$	871 319.5	904 940		9
2970.4	$3d^{10}7h$	$^2H^o$	$3d^{10}8i$	2I	871 245	904 901		9
2949.2	$3d^{10}7g$	2G	$3d^{10}8h$	$^2H^o$				9
2529.9	$3d^{10}8k$	$^2K^o$	$3d^{10}10l$	2L	904 940	944 456		9
2527.8	$3d^{10}8i$	2I	$3d^{10}10k$	$^2K^o$	904 901	944 449		9
2425.3	$3d^{10}8d$	$^2D_{5/2}$	$3d^{10}9f$	$^2F_{7/2}^o$				9
2418.3		$^3D_{3/2}$		$^2P_{1/2}$				9
2295.7 ^T	$3d^{10}7p$	$^2P_{3/2}^o$	$3d^{10}8s$	$^2S_{1/2}$	813 577	857 086		9
2292.2	$3d^{10}6d$	$^2D_{3/2}$	$3d^{10}7p$	$^2P_{1/2}$	768 898	812 506		9
2276.5	$3d^{10}5f$	$^2F_{5/2}^o$	$3d^{10}6d$	$^2D_{3/2}$	724 997.3	768 898		9
2237.2	$3d^{10}6d$	$^2D_{5/2}$	$3d^{10}6f$	$^2F_{7/2}^o$	769 179	813 865		9
2219.9		$^3D_{3/2}$		$^2P_{1/2}$	768 898	813 913		9
2152.3 ^T	$3d^{10}6p$	$^2P_{3/2}^o$	$3d^{10}6d$	$^2D_{3/2}$	722 429	768 898		9
2137.8		$^3P_{2/1}$		$^2D_{5/2}$	722 429	769 179		9
2068.7		$^1D_{1/2}$		$^2D_{3/2}$	720 565	768 898		9
1929.10	$3d^{10}6h$	$^2H^o$	$3d^{10}7i$	2I	819 482.0	871 319.5	2	17
1916.7	$3d^{10}6g$	2G	$3d^{10}7f$	$^2F^o$	815 450	867 623		9
1766.99	$3d^{10}5s$	$^2S_{1/2}$	$3d^{10}5p$	$^2P_{1/2}^o$	490 090.2	546 683.7	4	17
1656.78		$^1S_{1/2}$		$^3P_{2/1}$	490 090.2	550 448.0	5	17
1276.94	$3d^{10}4f$	$^2F_{5/2}^o$	$3d^{10}5d$	$^2D_{3/2}$	562 763.8	641 075.6	6	17
1267.68		$^3F_{7/2}$		$^2D_{5/2}$	562 738.1	641 623.1	7	17
1199.22	$3d^{10}5d$	$^2D_{5/2}$	$3d^{10}5f$	$^2F_{7/2}^o$	641 623.1	725 010.6	8	17
1191.59		$^3D_{3/2}$		$^2P_{1/2}$	641 075.6	724 997.3	2	17
1157.60	$3d^{10}5g$	2G	$3d^{10}6h$	$^2H^o$	733 095.6	819 482.0	4	17
1096.77	$3d^{10}5p$	$^2P_{3/2}^o$	$3d^{10}5d$	$^2D_{5/2}$	550 448.0	641 623.1	11	17
1059.41		$^1P_{1/2}$		$^3D_{3/2}$	546 683.7	641 075.6	20	17
704.057 ^C	$3d^{10}5p$	$^2P_{3/2}^o$	$3d^{10}6s$	$^2S_{1/2}$	550 448.0	692 482		17
685.879 ^C		$^1P_{1/2}$		$^3P_{2/1}$	546 683.7	692 482		13
695.918	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}4p$	$^2P_{1/2}^o$	0	143 695.3	2000	18
651.566		$^1S_{1/2}$		$^3P_{2/1}$	0	153 476.1	4000	18
587.121	$3d^{10}4f$	$^2F_{5/2}^o$	$3d^{10}5g$	$^2G_{7/2}$	562 763.8	733 086.4	45	18
586.969		$^3F_{7/2}$		$^2G_{9/2}$	562 738.1	733 104.8	50	18
579.246	$3d^{10}4d$	$^2D_{3/2}$	$3d^{10}5p$	$^2P_{1/2}^o$	374 046.5	546 683.7	40	18
571.203		$^1D_{1/2}$		$^3P_{2/1}$	375 381.0	550 448.0	60	18
533.753	$3d^{10}4d$	$^2D_{5/2}$	$3d^{10}4f$	$^2F_{7/2}^o$	375 381.0	562 738.1	500	18
533.651		$^3D_{5/2}$		$^2F_{5/2}$	375 381.0	562 763.8	10	18
529.893		$^1D_{3/2}$		$^2F_{5/2}$	374 046.5	562 763.8	400	18
453.360	$3d^{10}4p$	$^2P_{3/2}^o$	$3d^{10}4d$	$^2D_{3/2}$	153 476.1	374 046.5	500	18
450.649		$^1P_{1/2}$		$^3D_{3/2}$	153 476.1	375 381.0	5000	18
434.124		$^1P_{1/2}$		$^3P_{2/1}$	143 695.3	374 046.5	3500	18

Kr VIII (Cu sequence) — Continued

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	Reference
297.077	$3d^{10}4p$	$^2P_{3/2}$	$3d^{10}5s$	$^2S_{1/2}$	153 476.1	490 090.2	2000	18
288.684		$_{1/2}$		$_{1/2}$	143 695.3	490 090.2	1000	18
288.585 ^C	$3d^{10}4d$	$^2D_{3/2}$	$3d^{10}6p$	$^2P_{1/2}$	374 046.5	720 565		13
288.145 ^C		$_{5/2}$		$_{3/2}$	375 381.0	722 429		13
204.862	$3d^{10}4p$	$^2P_{3/2}$	$3d^{10}5d$	$^2D_{5/2}$	153 476.1	641 623.1	8	18
201.061		$_{1/2}$		$_{3/2}$	143 695.3	641 075.6	10	18
185.525	$3d^{10}4p$	$^2P_{3/2}$	$3d^{10}6s$	$^2S_{1/2}$	153 476.1	692 482	130	18
182.222		$_{1/2}$		$_{1/2}$	143 695.3	692 482	70	18
182.922	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}5p$	$^2P_{1/2}$	0	546 683.7	600	18
181.673		$_{1/2}$		$_{3/2}$	0	550 448.0	1000	18
162.416	$3d^{10}4p$	$^2P_{3/2}$	$3d^{10}6d$	$^2D_{5/2}$	153 476.1	769 179	35	18
159.948		$_{1/2}$		$_{3/2}$	143 695.3	768 898	15	18
155.518	$3d^{10}4p$	$^2P_{3/2}$	$3d^{10}7s$	$^2S_{1/2}$	153 476.1	796 490	50	18
153.187		$_{1/2}$		$_{1/2}$	143 695.3	796 490	35	18
145.516	$3d^{10}4p$	$^2P_{3/2}$	$3d^{10}7d$	$^2D_{5/2}$	153 476.1	840 686	10	18
143.512		$_{1/2}$		$_{3/2}$	143 695.3	840 501	3	18
142.123	$3d^{10}4p$	$^2P_{3/2}$	$3d^{10}8s$	$^2S_{1/2}$	153 476.1	857 086	10	18
140.177		$_{1/2}$		$_{1/2}$	143 695.3	857 086	3	18
138.780	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}6p$	$^2P_{1/2}$	0	720 565	100	18
138.422		$_{1/2}$		$_{3/2}$	0	722 429	200	18
127.738	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^3P^o)$	$^4P_{3/2}$	0	782 852	90	18
126.692		$_{1/2}$		$_{1/2}$	0	789 316	40	18
126.813	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^3P^o)$	$^4F_{3/2}$	0	788 563	15	18
125.437	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^3P^o)$	$^2D_{3/2}$	0	797 213	450	18
125.301	$3d^{10}4p$	$^2P_{3/2}$	$3d^9(^2D)4p^2(^1D)$	$^2S_{1/2}$	153 476.1	951 580	10	18
123.776		$_{1/2}$		$_{1/2}$	143 695.3	951 580	50	18
125.014	$3d^{10}4p$	$^2P_{3/2}$	$3d^9(^2D)4p^2(^1D)$	$^2P_{3/2}$	153 476.1	953 414	20	18
123.570		$_{3/2}$		$_{1/2}$	153 476.1	962 734	20	18
123.495		$_{1/2}$		$_{3/2}$	143 695.3	953 414	30	18
124.823	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^3P^o)$	$^2P_{3/2}$	0	801 134	550	18
124.759		$_{1/2}$		$_{1/2}$	0	801 545	450	18
124.481	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^3P^o)$	$^4D_{5/2}$	0	803 335	50	18
123.891		$_{1/2}$		$_{3/2}$	0	807 161	120	18
123.076	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}7p$	$^2P_{1/2}$	0	812 506	35	18
122.914		$_{1/2}$		$_{3/2}$	0	813 577	50	18
121.890	$3d^{10}4p$	$^2P_{3/2}$	$3d^9(^2D)4p^2(^3P)$	$^4F_{3/2}$	143 695.3	964 107	80	18
121.595	$3d^{10}4p$	$^2P_{3/2}$	$3d^9(^2D)4p^2(^3P)$	$^2D_{5/2}$	153 476.1	975 878	250	18
121.577		$_{1/2}$		$_{3/2}$	143 695.3	966 219	90	18
121.493	$3d^{10}4p$	$^2P_{3/2}$	$3d^9(^2D)4p^2(^3P)$	$^4P_{3/2}$	153 476.1	976 569	35	18
119.603		$_{1/2}$		$_{1/2}$	143 695.3	979 794	5	18
121.303	$3d^{10}4p$	$^2P_{3/2}$	$3d^9(^2D)4p^2(^3P)$	$^2P_{1/2}$	153 476.1	977 863	20	18
120.958		$_{3/2}$		$_{3/2}$	153 476.1	980 229	100	18
119.880		$_{1/2}$		$_{1/2}$	143 695.3	977 863	20	18
119.538		$_{1/2}$		$_{3/2}$	143 695.3	980 229	3	18

Kr VIII (Cu sequenced) — Continued

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
120.906	$3d^{10}4p$	$^2P_{1/2}$	$3d^9(^2D)4p\ ^2(^1D)$	$^2D_{3/2}$	143 695.3	970 784	100		18
119.447	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^1P^o)$	$^2P_{3/2}$	0	837 191	600		18
118.178		$^{1/2}$		$^{1/2}$	0	846 181	350		18
117.355	$3d^{10}4p$	$^2P_{3/2}$	$3d^9(^2D)4p\ ^2(^1S)$	$^2D_{5/2}$	153 476.1	1 005 591	12		18
116.047		$^{3/2}$		$^{3/2}$	153 476.1	1 015 205	1		18
114.742		$^{1/2}$		$^{3/2}$	143 695.3	1 015 205	4		18
115.248	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}8p$	$^2P_{3/2}$	0	867 694	5		18

Kr IX (Ni sequence)

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
117.709	$3d^{10}$	1S_0	$3d^9(^2D)4p$	$^3P_1^o$	0	849 553	30		18
115.738	$3d^{10}$	1S_0	$3d^9(^2D)4p$	$^1P_1^o$	0	864 020	1000		18
114.948	$3d^{10}$	1S_0	$3d^9(^2D)4p$	$^3D_1^o$	0	869 959	400		18
76.789	$3d^{10}$	1S_0	$3d^9(^2D)4f$	$^3P_1^o$	0	1 302 270	5		18
76.296	$3d^{10}$	1S_0	$3d^9(^2D)4f$	$^3D_1^o$	0	1 310 680	20		18
75.455	$3d^{10}$	1S_0	$3d^9(^2D)4f$	$^1P_1^o$	0	1 325 290	40		18

Kr X (Co sequence)

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
104.618	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^8(^3F)4p$	$^4G_{5/2}^o$	10 367	966 252	25		20
103.493		$^{5/2}$		$^{5/2}$	0	966 252	100		20
104.369	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^{10}$	$^2P_{3/2}^o$	10 367	968 510	75		20
103.251		$^{5/2}$		$^{3/2}$	0	968 510	20000		20
96.690		$^{3/2}$		$^{1/2}$	10 367	1 044 605	200		20
104.023	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^8(^3F)4p$	$^2D_{5/2}^o$	10 367	971 691	1000		20
103.796		$^{3/2}$		$^{5/2}$	10 367	973 832	50		20
102.914		$^{5/2}$		$^{3/2}$	0	971 691	300		20
102.687		$^{5/2}$		$^{5/2}$	0	973 832	10000		20
103.572	$3p^63d^9$	$^2D_{5/2}^o$	$3p^63d^8(^3F)4p$	$^4D_{5/2}^o$	0	965 513	10000		20
102.837	$3p^63d^9$	$^2D_{5/2}^o$	$3p^63d^8(^3F)4p$	$^2F_{7/2}^o$	0	972 410	8000		20
101.367		$^{5/2}$		$^{5/2}$	0	986 513	10000		20
102.750	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^8(^3F)4p$	$^4F_{3/2}^o$	10 367	983 596	200		20
102.151		$^{5/2}$		$^{5/2}$	0	978 945	1500		20
101.985		$^{5/2}$		$^{7/2}$	0	980 534	5000		20
101.668		$^{5/2}$		$^{3/2}$	0	983 596	200		20

Kr x (Co sequence) — Continued

λ (Å)	Classification		Energy Levels (cm ⁻¹)			Int.	Type	$A(s^{-1})$	References
102.299	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^8(^3P)4p$	$^4P_{3/2}^o$	10 367	987 902	1500		20
102.260		$^3/2$		$^5/2$	10 367	988 265	1500		20
101.224		$^5/2$		$^3/2$	0	987 902	100		20
101.181		$^5/2$		$^5/2$	0	988 265	30		20
101.719	$3p^63d^9$	$^2D_{5/2}$	$3p^63d^8(^3P)4p$	$^2G_{7/2}^o$	0	983 099	250		20
101.691	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^8(^1D)4p$	$^2F_{5/2}^o$	10 367	993 739	300		20
100.075		$^5/2$		$^7/2$	0	999 248	4000		20
101.162	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^8(^1D)4p$	$^2D_{5/2}^o$	10 367	998 883	1500		20
100.876		$^3/2$		$^5/2$	10 367	1 001 691	100		20
100.111		$^5/2$		$^3/2$	0	998 883	125		20
99.831		$^5/2$		$^5/2$	0	1 001 691	3000		20
101.065	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^8(^1D)4p$	$^2P_{1/2}^o$	10 367	999 829	5		20
100.261		$^3/2$		$^3/2$	10 367	1 007 768	150		20
100.662	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^8(^3P)4p$	$^4D_{3/2}^o$	10 367	1 003 790	100		20
100.653		$^3/2$		$^1/2$	10 367	1 003 879	150		20
100.297		$^3/2$		$^5/2$	10 367	1 007 410	100		20
99.262		$^5/2$		$^5/2$	0	1 007 410	2000		20
98.410		$^5/2$		$^7/2$	0	1 016 191	1200		20
99.648	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^8(^3P)4p$	$^2P_{1/2}^o$	10 367	1 013 897	1200		20
99.530		$^3/2$		$^3/2$	10 367	1 015 092	1000		20
98.513		$^5/2$		$^3/2$	0	1 015 092	250		20
99.530	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^8(^3P)4p$	$^2D_{5/2}^o$	10 367	1 015 092	1000		20
99.196		$^3/2$		$^3/2$	10 367	1 018 468	5		20
98.513		$^5/2$		$^5/2$	0	1 015 092	250		20
98.187		$^5/2$		$^3/2$	0	1 018 468	150		20
99.246	$3p^63d^9$	$^2D_{5/2}$	$3p^63d^8(^1G)4p$	$^2F_{7/2}^o$	0	1 007 600	8000		20
99.037		$^3/2$		$^5/2$	10 367	1 020 095	6000		20
98.910	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^8(^3P)4p$	$^2S_{1/2}^o$	10 367	1 021 383	75		20
97.012	$3p^63d^9$	$^2D_{5/2}$	$3p^63d^8(^1G)4p$	$^2G_{7/2}^o$	0	1 030 797	100		20
91.768	$3p^63d^9$	$^2D_{3/2}$	$3p^63d^8(^1S)4p$	$^2P_{3/2}^o$	0	1 089 708	50		20

Kr xviii (K sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
102.001	$3s^2 3p^6 3d$	${}^2D_{3/2}$	$3s^2 3p^5 ({}^3P^o) 3d^2 ({}^3F)$	${}^2F_{5/2}^o$	0	980 380	50	22
99.330	$3s^2 3p^6 3d$	${}^2D_{5/2}$	$3s^2 3p^5 ({}^2P^o) 3d^2 ({}^1G)$	${}^2F_{7/2}^o$	15 694	1 022 440	100	22
93.569	$3s^2 3p^6 3d$	${}^2D_{5/2}$	$3s^2 3p^5 ({}^2P^o) 3d^2 ({}^3F)$	${}^2D_{3/2}^o$	15 694	1 084 470	2	21
93.349		${}^5/2$		${}^5/2$	15 694	1 086 940	100	22
92.211		${}^3/2$		${}^3/2$	0	1 084 470	100	22
92.005		${}^3/2$		${}^5/2$	0	1 086 940	3	21
92.949	$3s^2 3p^6 3d$	${}^2D_{3/2}$	$3s^2 3p^5 ({}^2P^o) 3d^2 ({}^3P)$	${}^2P_{1/2}^o$	0	1 075 860	20	22
92.721		${}^5/2$		${}^3/2$	15 694	1 094 200	30	22
91.391		${}^3/2$		${}^3/2$	0	1 094 200	5	21
35.397	$3s^2 3p^6 3d$	${}^2D_{5/2}$	$3s^2 3p^6 4f$	${}^2F_{7/2}^o$	15 694	2 840 800	20	21
35.190		${}^3/2$		${}^5/2$	0	2 841 700	10	21

Kr xix (Ar sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
118.667	$3p^6$	1S_0	$3p^5 3d$	${}^3D_i^o$	0	842 690	15	23°, 21Δ
96.232	$3p^6$	1S_0	$3p^5 3d$	${}^1P_i^o$	0	1 039 160	45	23°, 21Δ

Kr xx (Cl sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
103.021	$3s^2 3p^5$	${}^2P_{3/2}^o$	$3s^2 3p^4 ({}^1D) 3d$	${}^2S_{1/2}^o$	0	970 680	200	25
100.254	$3s^2 3p^5$	${}^2P_{1/2}^o$	$3s^2 3p^4 ({}^3P) 3d$	${}^2D_{3/2}^o$	87 287	1 084 750	20	25
99.156		${}^3/2$		${}^5/2$	0	1 008 510	200	25
99.660	$3s^2 3p^5$	${}^2P_{3/2}^o$	$3s^2 3p^4 ({}^3P) 3d$	${}^2P_{3/2}^o$	0	1 003 410	60	25

Kr xxi (S sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
1268.7	$3s^2 3p^4$	3P_2	$3s^2 3p^4$	3P_1	0	78 680		24
108.854	$3s^2 3p^4$	1S_0	$3s^2 3p^3 ({}^3P^o) 3d$	${}^1P_i^o$	225 100	1 143 760	5	27
107.709	$3s^2 3p^4$	3P_1	$3s^2 3p^3 ({}^4S^o) 3d$	${}^3D_2^o$	78 680	1 007 100	10	27
107.173	$3s^2 3p^4$	3P_2	$3s^2 3p^3 ({}^2P^o) 3d$	${}^3P_2^o$	0	933 070	15	27
104.028	$3s^2 3p^4$	1D_2	$3s^2 3p^3 ({}^2D^o) 3d$	${}^1F_3^o$	114 820	1 076 100	10	27
103.684	$3s^2 3p^4$	3P_2	$3s^2 3p^3 ({}^2D^o) 3d$	${}^3P_2^o$	0	964 470	5	27
103.268	$3s^2 3p^4$	3P_2	$3s^2 3p^3 ({}^2P^o) 3d$	${}^1F_3^o$	0	968 350	100	27

Kr xxII (P sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References	
912.0	$3s^2 3p^3$	$^2D_{5/2}$	$3s^2 3p^3$	$^2P_{3/2}$	106 960	216 479	M1	5.59+3	
114.005	$3s^2 3p^3$	$^2P_{3/2}$	$3s^2 3p^2$	$(^3P) 3d$	$^2D_{5/2}$	216 479	1 093 630	10	28
111.669	$3s^2 3p^3$	$^4S_{3/2}$	$3s^2 3p^2$	$(^3P) 3d$	$^4P_{5/2}$	0	895 500	100	28
110.063					$^3P_{3/2}$	0	908 570	20	28
109.648	$3s^2 3p^3$	$^2D_{3/2}$	$3s^2 3p^2$	$(^1D) 3d$	$^2D_{3/2}$	77 801	989 810	10	28
108.977					$^5D_{5/2}$	77 801	995 430	10	28
108.362	$3s^2 3p^3$	$^2D_{5/2}$	$3s^2 3p^2$	$(^3P) 3d$	$^2F_{7/2}$	106 960	1 029 790	300	28

Kr xxIII (Si sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
3840.9	$3s^2 3p^2$	3P_1	$3s^2 3p^2$	3P_2	68 369	94 397	M1	1.46+2
1462.65		$_0$		$_1$	0	68 369	M1	4.91+3
853.8	$3s^2 3p^2$	3P_1	$3s^2 3p^2$	1D_2	68 369	185 490	M1	8.43+3
144.666	$3s^2 3p^2$	3P_2	$3s^2 3p^3$	3S_1	94 397	785 644	5	30
130.703	$3s^2 3p^2$	1D_2	$3s^2 3p 3d$	3D_3	185 490	950 580	30	30
127.653		$_2$		$_2$	185 490	968 860	20	30
124.322	$3s^2 3p^2$	3P_1	$3s^2 3p 3d$	3P_2	68 369	872 750	5	30
114.005		$_1$		$_0$	68 369	945 520	10	30
112.586		$_1$		$_1$	68 369	956 580	5	30
118.850	$3s^2 3p^2$	1D_2	$3s^2 3p 3d$	1F_3	185 490	1 026 920	10	30
118.468	$3s^2 3p^2$	3P_2	$3s^2 3p 3d$	1D_2	94 397	938 520	5	30
114.921		$_1$		$_2$	68 369	938 520	8	30
116.797	$3s^2 3p^2$	3P_2	$3s^2 3p 3d$	3D_3	94 397	950 580	10	30
112.586		$_0$		$_1$	0	888 210	50	30
107.231	$3s^2 3p^2$	3P_2	$3s^2 3p 3d$	1F_3	94 397	1 026 920	7	30

Kr xxIV (Al sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
272.54	$3s^2 3p$	$^2P_{3/2}$	$3s^2 3p^2$	$^4P_{3/2}$	97 312	464 230	70	33
248.07		3P_2		5P_2	97 312	500 420	180	33
242.56		1P_1		1P_1	0	412 270	720	33
194.420	$3s^2 3p$	$^2P_{3/2}$	$3s^2 3p^2$	$^2D_{5/2}$	97 312	611 662	2	32
172.471		1P_1		3P_2	0	579 808	10	32
152.111	$3s^2 3p$	$^2P_{3/2}$	$3s^2 3p^2$	$^2P_{1/2}$	97 312	754 727	10	32
149.765		3P_2		3P_2	97 312	765 062	50	32
132.44		1P_1		1P_1	0	754 727		26
130.702		1P_1		3P_2	0	765 062	30	32
152.016	$3s^2 3p$	$^2P_{1/2}$	$3s^2 3p^2$	$^2S_{1/2}$	0	657 825	20	32
134.097	$3s^2 3p$	$^2P_{3/2}$	$3s^2 3d$	$^2D_{3/2}$	97 312	843 013	15	32
131.795		3P_2		5P_2	97 312	856 066	200	32
118.626		1P_1		3P_2	0	843 013	50	32

Kr xxv (Mg sequence)

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	A (s ⁻¹)	References
242.548	3s ²	¹ S ₀	3s 3p	³ P ₁	0	412 290	20		34
217.03	3s 3p	¹ P ₁	3p ²	³ P ₂	632 187	1 092 830	5		33
217.03	3s 3d	³ D ₂	3p 3d	³ F ₃	1 184 970	1 645 700	6		36
192.92		₃		₄	1 196 618	1 715 000	<i>bl</i>		36
197.620	3s 3p	³ P ₂	3p ²	¹ D ₂	490 722	996 610	7		21
171.14		₁		₂	412 290	996 610	70		33
195.63	3s 3p	³ P ₂	3p ²	³ P ₁	490 722	1 001 890	20		33
192.92		₁		₀	412 290	930 645	<i>bl</i>		36
169.61		₁		₁	412 290	1 001 890	40		33
166.083		₂		₂	490 722	1 092 830	2		34
163.32		₀		₁	389 580	1 001 890	60		33
146.942		₁		₂	412 290	1 092 830			34
186.79	3s 3d	³ D ₃	3p 3d	³ D ₂	1 196 618	1 731 900	8		36
175.77		₃		₃	1 196 618	1 765 500	10		36
172.38		₂		₃	1 184 970	1 765 500	10		36
181.90	3s 3d	¹ D ₂	3p 3d	¹ F ₃	1 319 434	1 869 500?	18		36
174.86	3s 3d	¹ D ₂	3p 3d	¹ P ₁	1 319 434	1 891 300	6		36
174.01	3s 3p	¹ P ₁	3p ²	¹ S ₀	632 187	1 206 900	10		36
168.9	3s 3d	³ D ₂	3p 3d	³ P ₂	1 184 970	1 777 000	<i>bl</i>		36
168.9		₁		₀	1 177 690	1 769 800	<i>bl</i>		36
168.55		₁		₁	1 177 690	1 771 700	<i>bl</i>		36
168.55	3p 3d	¹ F ₃	3d ²	¹ G ₄	1 869 500?	2 464 200?	<i>bl</i>		36
161.31	3p 3d	³ P ₂	3d ²	³ F ₃	1 777 000	2 396 500	4		36
158.181	3s ²	¹ S ₀	3s 3p	¹ P ₁	0	632 187	600		34
155.09	3p 3d	³ D ₃	3d ²	³ F ₄	1 765 500	2 410 000	15		36
150.42		₂		₃	1 731 900	2 396 500	13		36
144.40		₁		₂	1 689 400	2 381 900	8		36
149.768	3p ²	¹ D ₂	3p 3d	¹ D ₂	996 610	1 664 300	23		36
148.61	3p ²	³ P ₂	3p 3d	³ D ₃	1 092 830	1 765 500	16		36
136.97		₁		₂	1 001 890	1 731 900	14		36
131.789		₀		₁	930 645	1 689 400	<i>bl</i>		36
146.15	3p ²	¹ S ₀	3p 3d	¹ P ₁	1 206 900	1 891 300	<i>bl</i>		36
146.15	3p ²	³ P ₂	3p 3d	³ P ₂	1 092 830	1 777 000	7		36
129.895		₁		₁	1 001 890	1 771 700	<i>bl</i>		36
145.508	3s 3p	¹ P ₁	3s 3d	¹ D ₂	632 187	1 319 434	10		34
145.498	3p 3d	³ P ₂	3d ²	³ P ₂	1 777 000	2 465 611	25		36
143.90	3p 3d	³ F ₄	3d ²	³ F ₄	1 715 000	2 410 000	10		36
133.24		₃		₃	1 645 700	2 396 500	<i>bl</i>		36
143.90	3s 3p	³ P ₂	3s 3d	³ D ₂	490 722	1 184 970	<i>bl</i>		36
141.664		₂		₃	490 722	1 196 618	15		34
129.420		₁		₂	412 290	1 184 970	50		33
126.886		₀		₁	389 580	1 177 690	4		34
136.04	3p ²	¹ D ₂	3p 3d	³ D ₂	996 610	1 731 900	11		36
129.895		₂		₃	996 610	1 765 500	<i>bl</i>		36

Kr xxv (Mg sequenced) — Continued

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
110.242	3s 3p	³ P ₁	3s 3d	¹ D ₂	412 290	1 319 434	10	21
21.840	3s ²	¹ S ₀	3s 4p	¹ F ₁	0	4 579 000	5	21

Kr xxvi (Na sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
220.064	2p ⁶ 3s	² S _{1/2}	2p ⁶ 3p	² P _{1/2}	0	454 413	50	37°,21 ^A
178.994		_{1/2}		_{3/2}	0	558 678	70	37°,21 ^A
165.160	2p ⁶ 3p	² P _{3/2}	2p ⁶ 3d	² D _{3/2}	558 678	1 164 182		37
159.920		_{3/2}		_{5/2}	558 678	1 183 991	30	37°,21 ^A
140.891		_{1/2}		_{3/2}	454 413	1 164 182	25	37°,21 ^A
59.459	2p ⁶ 4f	² F _{7/2}	2p ⁶ 5g	² G _{9/2}	5 070 800	6 752 600	8	21
59.377		_{5/2}		_{7/2}	5 067 200	6 751 400	6	21
55.93	2p ⁶ 4d	² D _{5/2}	2p ⁶ 5f	² F _{7/2}	4 955 600	6 743 600		31
55.71		_{3/2}		_{5/2}	4 947 400	6 742 400		31
50.86	2p ⁶ 4p	² P _{3/2}	2p ⁶ 5d	² D _{5/2}	4 720 300	6 686 500		31
49.93		_{1/2}		_{3/2}	4 679 700	6 683 100		31
48.59	2p ⁶ 4s	² S _{1/2}	2p ⁶ 5p	² P _{1/2}	4 492 700	6 550 700		31
48.11		_{1/2}		_{3/2}	4 492 700	6 571 200		31
25.728	2p ⁶ 3d	² D _{5/2}	2p ⁶ 4f	² F _{7/2}	1 183 991	5 070 800	40	37°,21 ^A
25.621		_{3/2}		_{5/2}	1 164 182	5 067 200	30	37°,21 ^A
25.416	2p ⁶ 3p	² P _{3/2}	2p ⁶ 4s	² S _{1/2}	558 678	4 492 700	30	21
24.766		_{1/2}		_{1/2}	454 413	4 492 700	10	21
22.743	2p ⁶ 3p	² P _{3/2}	2p ⁶ 4d	² D _{5/2}	558 678	4 955 600	10	21
22.257		_{1/2}		_{3/2}	454 413	4 947 400	5	21
21.369	2p ⁶ 3s	² S _{1/2}	2p ⁶ 4p	² P _{1/2}	0	4 679 700	10	21
21.185		_{1/2}		_{3/2}	0	4 720 300	15	21
17.99	2p ⁶ 3d	² D _{5/2}	2p ⁶ 5f	² F _{7/2}	1 183 991	6 743 600		31
17.94		_{3/2}		_{5/2}	1 164 182	6 742 400		31
16.34	2p ⁶ 3p	² P _{3/2}	2p ⁶ 5d	² D _{3/2}	558 678	6 683 100		31
16.07		_{1/2}		_{3/2}	454 413	6 683 100		31
15.21	2p ⁶ 3s	² S _{1/2}	2p ⁶ 5p	² P _{1/2}	0	6 550 700		31
15.21		_{1/2}		_{3/2}	0	6 571 200		31
7.570	2p ⁶ 3s	² S _{1/2}	2p ⁵ 3s ²	² P _{3/2}	0	13 210 000		38
7.322		_{1/2}		_{1/2}	0	13 657 000		38

Kr xxvii (Ne sequence)

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	A (s ⁻¹)	References
242.85	$2p^5(^2P_{3/2})3s$	($^3/2, ^1/2$) ₁ ^o		$2p^5(^2P_{3/2})3p$	($^3/2, ^1/2$) ₂	13 326 500	13 738 200		39
242.25		2			1	13 300 500	13 713 300		39
228.50		2			2	13 300 500	13 738 200		39
241.37	$2p^5(^2P_{1/2})3s$	($^1/2, ^1/2$) ₁ ^o		$2p^5(^2P_{1/2})3p$	($^1/2, ^1/2$) ₁	13 758 000	14 172 300		39
234.18		0			1	13 745 300	14 172 300		39
170.55 ^T		1			0	13 758 000	14 344 300?		39
196.30	$2p^5(^2P_{3/2})3s$	($^3/2, ^1/2$) ₁ ^o		$2p^5(^2P_{3/2})3p$	($^3/2, ^3/2$) ₁	13 326 500	13 835 900		39
188.38		2			3	13 300 500	13 831 300	11	39, 31 ^A
183.90		1			2	13 326 500	13 870 200	4	39 ^a , 31 ^A
175.55		2			2	13 300 500	13 870 200	10	39 ^a , 31 ^A
147.51 ^T		1			0	13 326 500	14 004 200?		39 ^b
190.14	$2p^5(^2P_{1/2})3s$	($^1/2, ^1/2$) ₁ ^o		$2p^5(^2P_{1/2})3p$	($^1/2, ^3/2$) ₁	13 758 000	14 283 900		39
186.70		1			2	13 758 000	14 293 600	8	39 ^a , 31 ^A
185.65		0			1	13 745 300	14 283 900	4	39 ^a , 31 ^A
188.38	$2p^5(^2P_{3/2})3p$	($^3/2, ^3/2$) ₂		$2p^5(^2P_{3/2})3d$	($^3/2, ^5/2$) ₂ ^o	13 870 200	14 401 100	11	39 ^a , 31 ^A
176.15		3			4	13 831 300	14 399 000	10	39 ^a , 31 ^A
173.05		2			3	13 870 200	14 448 200	10	39 ^a , 31 ^A
162.08		3			3	13 831 300	14 448 200		39
177.65	$2p^5(^2P_{3/2})3p$	($^3/2, ^3/2$) ₃		$2p^5(^2P_{3/2})3d$	($^3/2, ^3/2$) ₃ ^o	13 831 300	14 394 500		39
169.97		1			2	13 835 900	14 424 300	4	39 ^a , 31 ^A
174.10	$2p^5(^2P_{1/2})3p$	($^1/2, ^3/2$) ₁		$2p^5(^2P_{1/2})3d$	($^1/2, ^5/2$) ₂ ^o	14 283 900	14 858 300	10	39 ^a , 31 ^A
173.60		2			3	14 293 600	14 869 700	9	39 ^a , 31 ^A
159.06	$2p^5(^2P_{3/2})3p$	($^3/2, ^1/2$) ₁		$2p^5(^2P_{3/2})3d$	($^3/2, ^3/2$) ₀ ^o	13 713 300	14 342 000		39
158.45 ^T		2			1	13 738 200	14 369 400		39
152.38		1			1	13 713 300	14 369 400		39
152.38		2			3	13 738 200	14 394 500		39
145.75		2			2	13 738 200	14 424 300		39
150.89	$2p^5(^2P_{3/2})3p$	($^3/2, ^1/2$) ₂		$2p^5(^2P_{3/2})3d$	($^3/2, ^5/2$) ₂ ^o	13 738 200	14 401 100		39
145.35		1			2	13 713 300	14 401 100		39
149.75	$2p^5(^2P_{1/2})3p$	($^1/2, ^1/2$) ₁		$2p^5(^2P_{1/2})3d$	($^1/2, ^3/2$) ₂ ^o	14 172 300	14 840 100		39
7.504	$2s^22p^6$	¹ S ₀	$2s^22p^5(^2P_{3/2})3s$	($^3/2, ^1/2$) ₁ ^o		0	13 326 500	9	41
7.268	$2s^22p^6$	¹ S ₀	$2s^22p^5(^2P_{1/2})3s$	($^1/2, ^1/2$) ₁ ^o		0	13 758 000	6	41
6.955	$2s^22p^6$	¹ S ₀	$2s^22p^5(^2P_{3/2})3d$	($^3/2, ^3/2$) ₁ ^o		0	14 369 400	7	41
6.878	$2s^22p^6$	¹ S ₀	$2s^22p^5(^2P_{3/2})3d$	($^3/2, ^5/2$) ₁ ^o		0	14 533 000	10	41
6.694	$2s^22p^6$	¹ S ₀	$2s^22p^5(^2P_{1/2})3d$	($^1/2, ^3/2$) ₁ ^o		0	14 928 000	8	41
6.383	$2s^22p^6$	¹ S ₀	$2s^2p^6(^2S_{1/2})3p$	($^1/2, ^1/2$) ₁ ^o		0	15 662 000	5	41
6.333	$2s^22p^6$	¹ S ₀	$2s^2p^6(^2S_{1/2})3p$	($^1/2, ^3/2$) ₁ ^o		0	15 783 000	4	41

Kr xxviii (F sequence)

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References	
223.995	$2s^2 2p^5$	$^2P_{3/2}^o$		$2s^2 2p^5$	$^2P_{1/2}^o$	0	446 440	M1	1.59+6	43°,58*
68.733	$2s^2 2p^5$	$^2P_{1/2}^o$		$2s^2 2p^6$	$^2S_{1/2}$	446 440	1 901 350	10		43°,21 ^A
52.594		3_2			$^1_{1/2}$	0	1 901 350	25		43°,21 ^A
7.209	$2s^2 2p^5$	$^2P_{3/2}^o$		$2s^2 2p^4(^3P_2)3s$	$(2, 1/2)_{5/2}$	0	13 872 000		38	
7.193		3_2			$^3_{3/2}$	0	13 902 000		38	
7.209	$2s^2 2p^5$	$^2P_{1/2}^o$		$2s^2 2p^4(^3P_1)3s$	$(1, 1/2)_{1/2}$	446 440	14 337 000		38	
6.997		3_2			$^3_{3/2}$	0	14 292 000		38	
6.975		3_2			$^1_{1/2}$	0	14 337 000		38	
7.162	$2s^2 2p^5$	$^2P_{1/2}^o$		$2s^2 2p^4(^3D_2)3s$	$(2, 1/2)_{3/2}$	446 440	14 409 000		38	
6.941		3_2			$^5_{5/2}$	0	14 407 000		38	
7.123	$2s^2 2p^5$	$^2P_{3/2}^o$		$2s^2 2p^4(^3P_0)3s$	$(0, 1/2)_{1/2}$	0	14 039 000		38	
6.881	$2s^2 2p^5$	$^2P_{1/2}^o$		$2s^2 2p^4(^3P_2)3d$	$(2, 5/2)_{3/2}$	446 440	14 977 000		38	
6.678		3_2			$^3_{3/2}$	0	14 977 000		38	
6.678		3_2			$^1_{1/2}$	0	14 977 000?		38	
6.663		3_2			$^5_{5/2}$	0	15 008 000		38	
6.727	$2s^2 2p^5$	$^2P_{1/2}^o$		$2s^2 2p^4(^3P_0)3d$	$(0, 3/2)_{3/2}$	446 440	15 312 000		38	
6.715	$2s^2 2p^5$	$^2P_{3/2}^o$		$2s^2 2p^4(^3P_2)3d$	$(2, 3/2)_{1/2}$	0	14 892 000		38	
6.699	$2s^2 2p^5$	$^2P_{1/2}^o$		$2s^2 2p^4(^3P_1)3d$	$(1, 5/2)_{3/2}$	446 440	15 374 000		38	
6.502		3_2			$^5_{5/2}$	0	15 380 000		38	
6.663	$2s^2 2p^5$	$^2P_{1/2}^o$		$2s^2 2p^4(^1D_2)3d$	$(2, 3/2)_{3/2}$	446 440	15 460 000		38	
6.479		3_2			$^3_{1/2}$	0	15 434 000		38	
6.466		3_2			$^3_{3/2}$	0	15 460 000		38	
6.466		3_2			$^5_{5/2}$	0	15 466 000		38	
6.639	$2s^2 2p^5$	$^2P_{3/2}^o$		$2s^2 2p^4(^1S_0)3d$	$(0, 3/2)_{3/2}$	0	15 062 000		38	
6.626	$2s^2 2p^5$	$^2P_{3/2}^o$		$2s^2 2p^4(^3P_0)3d$	$(0, 5/2)_{5/2}$	0	15 092 000		38	
6.626	$2s^2 2p^5$	$^2P_{1/2}^o$		$2s^2 2p^4(^1D_2)3d$	$(2, 5/2)_{3/2}$	446 440	15 557 000		38	
6.614		$^1_{1/2}$			$^3_{1/2}$	446 440	15 573 000		38	
6.428		3_2			$^3_{3/2}$	0	15 557 000		38	
6.418		3_2			$^1_{1/2}$	0	15 573 000		38	
6.519	$2s^2 2p^5$	$^2P_{3/2}^o$		$2s^2 2p^4(^3P_1)3d$	$(1, 3/2)_{5/2}$	0	15 340 000		38	
6.428	$2s^2 2p^5$	$^2P_{1/2}^o$		$2s^2 p^6(^1P^o)3p$	$^2S_{1/2}$	446 440	15 990 000?		38	
6.259		3_2			$^1_{1/2}$	0	15 990 000?		38	
6.214	$2s^2 2p^5$	$^2P_{1/2}^o$		$2s^2 p^6(^1P^o)3p$	$^4D_{3/2}$	446 440	16 540 000?		38	
6.185	$2s^2 p^6$	$^2S_{1/2}$		$2p^6 3p$	$^2P_{1/2}$	1 901 350	18 069 000		38	
6.145		$^1_{1/2}$			3_2	1 901 350	18 175 000		38	
6.171	$2s^2 2p^5$	$^2P_{1/2}^o$		$2s^2 p^6(^3P^o)3p$	$^4P_{3/2}$	446 440	16 652 000?		38	
6.171	$2s^2 2p^5$	$^2P_{3/2}^o$		$2s^2 p^6(^1P^o)3p$	$^2P_{1/2}$	0	16 200 000?		38	
6.166	$2s^2 2p^5$	$^2P_{3/2}^o$		$2s^2 p^6(^1P^o)3p$	$^2D_{5/2}$	0	16 218 000?		38	
6.145	$2s^2 2p^5$	$^2P_{3/2}^o$		$2s^2 p^6(^3P^o)3p$	$^2S_{1/2}$	0	16 273 000?		38	
6.145	$2s^2 2p^5$	$^2P_{1/2}^o$		$2s^2 p^6(^3P^o)3p$	$^2P_{1/2}$	446 440	16 720 000?		38	
6.129		3_2			3_2	0	16 316 000?		38	

Kr xxix (O sequence)

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
235.95	$2s^2 2p^4$	3P_2	$2s^2 2p^4$	3P_1	0	423 820	M1	1.34+6	43°,58*
190.515	$2s^2 2p^4$	3P_2	$2s^2 2p^4$	1D_2	0	524 890	M1	9.82+5	43°,58*
86.98	$2s^2 2p^4$	1D_2	$2s 2p^5$	$^3P_2^o$	524 890	1 674 650			43
74.663		2		1	524 890	1 864 320			43
79.947	$2s^2 2p^4$	3P_1	$2s 2p^5$	$^3P_2^o$	423 820	1 674 650			43
69.414		1		1	423 820	1 864 320			43
59.714		2		2		0			43°,21
58.700		0		1	160 700	1 864 320			43
58.48		1		0	423 820	2 133 800			42
53.640		2		1		0			43°,21
53.977	$2s^2 2p^4$	1D_2	$2s 2p^5$	$^1P_1^o$	524 890	2 377 700			21

Kr xxx (N sequence)

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
259.807	$2s^2 2p^3$	$^4S_{3/2}^o$	$2s^2 2p^3$	$^2D_{3/2}^o$	0	384 900	M1	1.21+6	43°,58*
205.247		3/2		5/2	0	487 220	M1	2.19+5	43°,58*
160.90 ^T	$2s^2 2p^3$	$^4S_{3/2}^o$	$2s^2 2p^3$	$^2P_{1/2}^o$	0	621 500	M1	1.52+6	43°,58*
110.62	$2s^2 2p^3$	$^2D_{5/2}^o$	$2s 2p^4$	$^4P_{5/2}$	487 220	1 391 300			43
86.26		5/2		3/2	487 220	1 646 580			43
71.875	$2s^2 2p^3$	$^4S_{3/2}^o$	$2s 2p^4$	$^4P_{5/2}$	0	1 391 300			43
60.732		3/2		3/2	0	1 646 580			43
60.332		3/2		1/2	0	1 657 500			43
63.671	$2s^2 2p^3$	$^2D_{3/2}^o$	$2s 2p^4$	$^2D_{3/2}^o$	384 900	1 955 480			43
54.596	$2s^2 2p^3$	$^2D_{5/2}^o$	$2s 2p^4$	$^2P_{3/2}^o$	487 220	2 318 860			43

Kr xxxi (C sequence)

λ (Å)	Classification			Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
252.001	$2s^2 2p^2$	3P_0	$2s^2 2p^2$	3P_1	0	396 820	M1	8.78+5	43°,58*
95.057	$2s^2 2p^2$	3P_2	$2s 2p^3$	$^3D_1^o$	478 200	1 530 200			43
79.557		1		2	396 820	1 653 800			43
76.610		2		3	478 200	1 783 500			43
65.352		0		1	0	1 530 200			43
79.45	$2s 2p^3$	$^3P_1^o$	$2p^4$	3P_0	1 999 100	3 258 000			46
64.14	$2s^2 2p^2$	3P_1	$2s 2p^3$	$^3P_0^o$	396 820	1 955 900			46
63.103		2		2	478 200	2 062 900			43
62.411		1		1	396 820	1 999 100			43
59.748	$2s^2 2p^2$	3P_2	$2s 2p^3$	$^3S_1^o$	478 200	2 151 900			43
56.976 ^T		1		1	396 820	2 151 900			43

Kr xxxII (B sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References	
203.021	$2s^2 2p$	${}^2P_{1/2}^o$	$2s^2 2p$	${}^2P_{3/2}^o$	0	492 560	M1	1.06+6	43°, 58*
99.75	$2s^2 2p$	${}^2D_{5/2}$	$2p^3$	${}^2D_{5/2}$	1 671 000	2 738 000			45
84.89	$2s^2 2p$	${}^2P_{3/2}^o$	$2s^2 2p$	${}^2D_{5/2}$	492 560	1 671 000			45
69.957		${}^{1/2}$		${}^{3/2}$	0	1 430 000			43
78.90	$2s^2 2p$	${}^2P_{3/2}$	$2p^3$	${}^2P_{3/2}^o$	2 041 000	3 308 000			45
66.538	$2s^2 2p$	${}^2P_{1/2}^o$	$2s^2 2p$	${}^2S_{1/2}$	0	1 503 000			43
65.00	$2s^2 2p$	${}^2P_{3/2}^o$	$2s^2 2p$	${}^2P_{1/2}$	492 560	2 031 000			45
64.59		${}^{3/2}$		${}^{3/2}$	492 560	2 041 000			45

Kr xxxIII (Be sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References	
235.48	$1s^2 2s^2 2p$	${}^3P_1^o$	$1s^2 2s^2 2p$	${}^3P_2^o$	588 770	1 013 440	M1	9.29+5	43°, 58*
169.845	$1s^2 2s^2$	1S_0	$1s^2 2s^2 2p$	${}^3P_1^o$	0	588 770			43
123.10	$1s^2 2s^2 2p$	${}^3P_2^o$	$1s^2 2p^2$	3P_1	1 013 440	1 827 200			45
117.74		1		0	588 770	1 438 100			45
111.65		2		2	1 013 440	1 909 800			45
80.75		1		1	588 770	1 827 200			45
75.66		0		1	505 500	1 827 200			45
75.66		1		2	588 770	1 909 800			45
98.19	$1s^2 2s^2 2p$	${}^1P_1^o$	$1s^2 2p^2$	1D_2	1 374 460	2 391 300			45
77.10	$1s^2 2s^2 2p$	${}^1P_1^o$	$1s^2 2p^2$	1S_0	1 374 460	2 671 500			45
72.756	$1s^2 2s^2$	1S_0	$1s^2 2s^2 2p$	${}^1P_1^o$	0	1 374 460			43
72.66	$1s^2 2s^2 2p$	${}^3P_2^o$	$1s^2 2p^2$	1D_2	1 013 440	2 391 300			45

Kr xxxIV (Li sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References	
190.94 ^C	$1s^2 2p$	${}^2P_{1/2}^o$	$1s^2 2p$	${}^2P_{3/2}^o$	574 594	1 098 310	M1		43
174.036	$1s^2 2s$	${}^2S_{1/2}$	$1s^2 2p$	${}^2P_{1/2}^o$	0	574 594			43
91.049		${}^{1/2}$		${}^{3/2}$	0	1 098 310			43
34.532 ^C	$1s^2 4p$	${}^2P_{3/2}^o$	$1s^2 5d$	${}^2D_{3/2}$	[25 148 400]	[28 044 300]			47
34.406 ^C		${}^{3/2}$		${}^{5/2}$	[25 148 400]	[28 054 900]			47
33.770 ^C		${}^{1/2}$		${}^{3/2}$	[25 083 100]	[28 044 300]			47
16.382 ^C	$1s^2 3p$	${}^2P_{3/2}^o$	$1s^2 4s$	${}^2S_{1/2}$	[18 912 400]	[25 016 500]			47
15.977 ^C		${}^{1/2}$		${}^{1/2}$	[18 757 400]	[25 016 500]			47
15.973 ^C	$1s^2 3p$	${}^2P_{3/2}^o$	$1s^2 4d$	${}^2D_{3/2}$	[18 912 400]	[25 173 100]			47
15.920 ^C		${}^{3/2}$		${}^{5/2}$	[18 912 400]	[25 193 700]			47
15.587 ^C		${}^{1/2}$		${}^{3/2}$	[18 757 400]	[25 173 100]			47
15.421 ^C	$1s^2 3s$	${}^2S_{1/2}$	$1s^2 4p$	${}^2P_{1/2}^o$	[18 598 400]	[25 083 100]			47
15.267 ^C		${}^{1/2}$		${}^{3/2}$	[18 598 400]	[25 148 400]			47

Kr xxxiv (Li sequence) — Continued

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	A (s ⁻¹)	References
11.047 ^C	$1s^2 3p$	${}^2P_{3/2}$	$1s^2 5s$	${}^2S_{1/2}$	[18 912 400]	[27 964 400]		47
10.861 ^C		${}^1/2$			[18 757 400]	[27 964 400]		47
10.951 ^C	$1s^2 3p$	${}^2P_{3/2}$	$1s^2 5d$	${}^2D_{3/2}$	[18 912 400]	[28 044 300]		47
10.938 ^C		${}^3/2$		${}^5/2$	[18 912 400]	[28 054 900]		47
10.768 ^C		${}^1/2$		${}^3/2$	[18 757 400]	[28 044 300]		47
5.7143 ^C	$1s^2 2p$	${}^2P_{3/2}$	$1s^2 3s$	${}^2S_{1/2}$	1 098 310	[18 598 400]		47
5.5482 ^C		${}^1/2$		${}^1/2$	574 594	[18 598 400]		47
5.5952 ^C	$1s^2 2p$	${}^2P_{3/2}$	$1s^2 3d$	${}^2D_{3/2}$	1 098 310	[18 970 900]		47
5.5799 ^C		${}^3/2$		${}^5/2$	1 098 310	[19 019 700]		47
5.4359 ^C		${}^1/2$		${}^3/2$	574 594	[18 970 900]		47
5.3312 ^C	$1s^2 2s$	${}^2S_{1/2}$	$1s^2 3p$	${}^2P_{1/2}$	0	[18 757 400]		47
5.2875 ^C		${}^1/2$		${}^3/2$	0	[18 912 400]		47
4.18092 ^C	$1s^2 2p$	${}^2P_{3/2}$	$1s^2 4s$	${}^2S_{1/2}$	1 098 310	[25 016 500]		47
4.09133 ^C		${}^1/2$			574 594	[25 016 500]		47
4.15372 ^C	$1s^2 2p$	${}^2P_{3/2}$	$1s^2 4d$	${}^2D_{3/2}$	1 098 310	[25 173 100]		47
4.15017 ^C		${}^3/2$		${}^5/2$	1 098 310	[25 193 700]		47
4.06529 ^C		${}^1/2$		${}^3/2$	574 594	[25 173 100]		47
3.98675 ^C	$1s^2 2s$	${}^2S_{1/2}$	$1s^2 4p$	${}^2P_{1/2}$	0	[25 083 100]		47
3.97640 ^C		${}^1/2$		${}^3/2$	0	[25 148 400]		47
3.72216 ^C	$1s^2 2p$	${}^2P_{3/2}$	$1s^2 5s$	${}^2S_{1/2}$	1 098 310	[27 964 400]		47
3.65099 ^C		${}^1/2$		${}^1/2$	574 594	[27 964 400]		47
3.71113 ^C	$1s^2 2p$	${}^2P_{3/2}$	$1s^2 5d$	${}^2D_{3/2}$	1 098 310	[28 044 300]		47
3.70967 ^C		${}^3/2$		${}^5/2$	1 098 310	[28 054 900]		47
3.64037 ^C		${}^1/2$		${}^3/2$	574 594	[28 044 300]		47
3.57163 ^C	$1s^2 2s$	${}^2S_{1/2}$	$1s^2 5p$	${}^2P_{1/2}$	0	[27 998 400]		47
3.56739 ^C		${}^1/2$		${}^3/2$	0	[28 031 700]		47
0.96894 ^C	$1s^2 2p$	${}^2P_{3/2}$	$1s 2s^2$	${}^2S_{1/2}$	1 098 310	[104 304 000]		47
0.96405 ^C		${}^1/2$		${}^1/2$	574 594	[104 304 000]		47
0.96037 ^C	$1s^2 2p$	${}^2P_{3/2}$	$1s({}^2S)2p({}^3P)$	${}^4P_{1/2}$	1 098 310	[105 225 000]		47
0.95709 ^C		${}^3/2$		${}^3/2$	1 098 310	[105 582 000]		47
0.95614 ^C		${}^3/2$		${}^5/2$	1 098 310	[105 685 000]		47
0.95556 ^C		${}^1/2$		${}^1/2$	574 594	[105 225 000]		47
0.95231 ^C		${}^1/2$		${}^3/2$	574 594	[105 582 000]		47
0.95725 ^C	$1s^2 2s$	${}^2S_{1/2}$	$1s({}^2S)2s 2p({}^3P)$	${}^4P_{1/2}$	0	[104 466 000]		47
0.95652 ^C		${}^1/2$		${}^3/2$	0	[104 546 000]		47
0.95500 ^C	$1s^2 2p$	${}^2P_{3/2}$	$1s({}^2S)2p({}^3P)$	${}^2P_{1/2}$	1 098 310	[105 810 000]		47
0.95026 ^C		${}^1/2$		${}^1/2$	574 594	[105 810 000]		47
0.94972 ^C		${}^3/2$		${}^3/2$	1 098 310	[106 393 000]		47
0.94502 ^C		${}^1/2$		${}^3/2$	574 594	[106 393 000]		47
0.95460 ^C	$1s^2 2p$	${}^2P_{3/2}$	$1s({}^2S)2p({}^1D)$	${}^2D_{3/2}$	1 098 310	[105 854 000]		47
0.95137 ^C		${}^3/2$		${}^5/2$	1 098 310	[106 210 000]		47
0.94985 ^C		${}^1/2$		${}^3/2$	574 594	[105 854 000]		47
0.95288 ^C	$1s^2 2s$	${}^2S_{1/2}$	$1s({}^2S)2s 2p({}^3P)$	${}^2P_{1/2}$	0	[104 945 000]		47
0.94961 ^C		${}^1/2$		${}^3/2$	0	[105 306 000]		47
0.94818 ^C	$1s^2 2p$	${}^2P_{3/2}$	$1s({}^2S)2p({}^1S)$	${}^2S_{1/2}$	1 098 310	[106 564 000]		47
0.94349 ^C		${}^1/2$		${}^1/2$	574 594	[106 564 000]		47
0.94804 ^C	$1s^2 2s$	${}^2S_{1/2}$	$1s({}^2S)2s 2p({}^1P)$	${}^2P_{1/2}$	0	[105 481 000]		47
0.94746 ^C		${}^1/2$		${}^3/2$	0	[105 545 000]		47

Kr xxxv (He sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
4970 ^C	1s 4p	³ P ₂	1s 4d	³ D ₂	[131 045 300]	[131 065 400]		
2320 ^C		2		3	[131 045 300]	[131 088 300]		
1150 ^C		1		1	[130 979 800]	[131 066 600]		
1120 ^C		0		1	[130 977 100]	[131 066 600]		
4520 ^C	1s 5s	³ S ₁	1s 5p	³ P ₁ ^o	[134 043 100]	[134 065 200]		
1800 ^C		1		2	[134 043 100]	[134 098 700]		
2300 ^C	1s 4s	³ S ₁	1s 4p	³ P ₁ ^o	[130 936 300]	[130 979 800]		
917 ^C		1		2	[130 936 300]	[131 045 300]		
2200 ^C	1s 5s	¹ S ₀	1s 5p	¹ P ₁ ^o	[134 064 500]	[134 110 000]		
1130 ^C	1s 4s	¹ S ₀	1s 4p	¹ P ₁ ^o	[130 978 400]	[131 067 200]		
963 ^C	1s 3s	³ S ₁	1s 3p	³ P ₁ ^o	[124 183 600]	[124 287 400]		
385.2 ^C		1		2	[124 183 600]	[124 443 200]		
477.3 ^C	1s 3s	¹ S ₀	1s 3p	¹ P ₁ ^o	[124 285 900]	[124 495 400]		
279.8	1s 2s	³ S ₁	1s 2p	³ P ₀ ^o	[104 691 700]	105 049 100	45	
265.6 ^C		1		1	[104 691 700]	105 068 200		
111.11		1		2	[104 691 700]	105 591 700	45	
140.9 ^C	1s 2s	¹ S ₀	1s 2p	¹ P ₁ ^o	[105 073 300]	105 783 200		
91.62 ^C	1s 2s	³ S ₁	1s 2p	¹ P ₁ ^o	[104 691 700]	105 783 200		
33.363 ^C	1s 4p	¹ P ₁ ^o	1s 5s	¹ S ₀	[131 067 200]	[134 064 500]		
33.358 ^C	1s 4p	³ P ₂ ^o	1s 5s	³ S ₁	[131 045 300]	[134 043 100]		
32.645 ^C		1		1	[130 979 800]	[134 043 100]		
31.960 ^C	1s 4s	³ S ₁	1s 5p	³ P ₁ ^o	[130 936 300]	[134 065 200]		
31.933 ^C	1s 4s	¹ S ₀	1s 5p	¹ P ₁ ^o	[130 978 400]	[134 110 000]		
15.425 ^C	1s 3p	¹ P ₁ ^o	1s 4s	¹ S ₀	[124 495 400]	[130 978 400]		
15.424 ^C	1s 3d	³ D ₁	1s 4p	³ P ₀ ^o	[124 493 800]	[130 977 100]		
15.418 ^C		1		1	[124 493 800]	[130 979 800]		
15.411 ^C		2		1	[124 491 000]	[130 979 800]		
15.384 ^C		3		2	[124 545 100]	[131 045 300]		
15.257 ^C		2		2	[124 491 000]	[131 045 300]		
15.401 ^C	1s 3p	³ P ₂ ^o	1s 4s	³ S ₁	[124 443 200]	[130 936 300]		
15.040 ^C		1		1	[124 287 400]	[130 936 300]		
15.343 ^C	1s 3d	¹ D ₂	1s 4p	¹ P ₁ ^o	[124 549 400]	[131 067 200]		
15.164 ^C	1s 3p	¹ P ₁ ^o	1s 4d	¹ D ₂	[124 495 400]	[131 090 100]		
15.101 ^C	1s 3p	³ P ₂ ^o	1s 4d	³ D ₂	[124 443 200]	[131 065 400]		
15.049 ^C		2		3	[124 443 200]	[131 088 300]		
14.751 ^C		1		1	[124 287 400]	[131 066 600]		
14.739 ^C		0		1	[124 281 700]	[131 066 600]		
14.746 ^C	1s 3s	¹ S ₀	1s 4p	¹ P ₁ ^o	[124 285 900]	[131 067 200]		
14.714 ^C	1s 3s	³ S ₁	1s 4p	³ P ₁ ^o	[124 183 600]	[130 979 800]		
14.574 ^C		1		2	[124 183 600]	[131 045 300]		
10.450 ^C	1s 3p	¹ P ₁ ^o	1s 5s	¹ S ₀	[124 495 400]	[134 064 500]		
10.417 ^C	1s 3p	³ P ₂ ^o	1s 5s	³ S ₁	[124 443 200]	[134 043 100]		
10.250 ^C		1		1	[124 287 400]	[134 043 100]		

Kr xxxv (He sequence)

λ (Å)	Classification		Energy Levels (cm^{-1})		Int.	Type	$A(\text{s}^{-1})$	References
10.179 ^C	1s 3s	¹ S ₀	1s 5p	¹ P ₁	[124 285 900]	[134 110 000]		
10.120 ^C	1s 3s	³ S ₁	1s 5p	³ P ₁	[124 183 600]	[134 065 200]		
10.086 ^C		₁		₂	[124 183 600]	[134 098 700]		
5.4046 ^C	1s 2p	¹ P ₁	1s 3s	¹ S ₀	105 783 200	[124 285 900]		
5.3787 ^C	1s 2p	³ P ₂	1s 3s	³ S ₁	105 591 700	[124 183 600]		
5.2314 ^C		₁		₁	105 068 200	[124 183 600]		
5.3287 ^C	1s 2p	¹ P ₁	1s 3d	¹ D ₂	105 783 200	[124 549 400]		
5.2912 ^C	1s 2p	³ P ₂	1s 3d	³ D ₂	105 591 700	[124 491 000]		
5.2761 ^C		₂		₃	105 591 700	[124 545 100]		
5.1478 ^C		₁		₁	105 068 200	[124 493 800]		
5.1428 ^C		₀		₁	105 049 100	[124 493 800]		
5.1488 ^C	1s 2s	¹ S ₀	1s 3p	¹ P ₁	[105 073 300]	[124 495 400]		
5.1032 ^C	1s 2s	³ S ₁	1s 3p	³ P ₁	[104 691 700]	[124 287 400]		
5.0629 ^C		₁		₂	[104 691 700]	[124 443 200]		
3.96901 ^C	1s 2p	¹ P ₁	1s 4s	¹ S ₀	105 783 200	[130 978 400]		
3.95149 ^C	1s 2p	¹ P ₁	1s 4d	¹ D ₂	105 783 200	[131 090 100]		
3.94561 ^C	1s 2p	³ P ₂	1s 4s	³ S ₁	105 591 700	[130 936 300]		
3.86677 ^C		₁		₁	105 068 200	[130 936 300]		
3.92562 ^C	1s 2p	³ P ₂	1s 4d	³ D ₂	105 591 700	[131 065 400]		
3.92209 ^C		₂		₃	105 591 700	[131 088 300]		
3.84639 ^C		₁		₁	105 068 200	[131 066 600]		
3.84357 ^C		₀		₁	105 049 100	[131 066 600]		
3.84706 ^C	1s 2s	¹ S ₀	1s 4p	¹ P ₁	[105 073 300]	[131 067 200]		
3.80400 ^C	1s 2s	³ S ₁	1s 4p	³ P ₁	[104 691 700]	[130 979 800]		
3.79455 ^C		₁		₂	[104 691 700]	[131 045 300]		
3.53591 ^C	1s 2p	¹ P ₁	1s 5s	¹ S ₀	105 783 200	[134 064 500]		
3.51477 ^C	1s 2p	³ P ₂	1s 5s	³ S ₁	105 591 700	[134 043 100]		
3.45126 ^C		₁		₁	105 068 200	[134 043 100]		
3.44392 ^C	1s 2s	¹ S ₀	1s 5p	¹ P ₁	[105 073 300]	[134 110 000]		
3.40443 ^C	1s 2s	³ S ₁	1s 5p	³ P ₁	[104 691 700]	[134 065 200]		
3.40055 ^C		₁		₂	[104 691 700]	[134 098 700]		
0.95519 ^C	1s ²	¹ S ₀	1s 2s	³ S ₁	0	[104 691 700]	M1	48
0.95176	1s ²	¹ S ₀	1s 2p	³ P ₁	0	105 068 200		49,50°
0.94704 ^C		₀		₂	0	105 591 700	M2	49
0.94533	1s ²	¹ S ₀	1s 2p	¹ P ₁	0	105 783 200		49,50°
0.93653 ^C	1s 2p	¹ P ₁	2s ²	¹ S ₀	105 783 200	[212 560 000]		47
0.93226 ^C	1s 2p	¹ P ₁	2p ²	³ P ₀	105 783 200	[213 049 000]		47
0.92872 ^C		₁		₁	105 783 200	[213 458 000]		47
0.92308 ^C		₁		₂	105 783 200	[214 116 000]		47
0.93030 ^C	1s 2p	³ P ₁	2s ²	¹ S ₀	105 068 200	[212 560 000]		47
0.92920 ^C	1s 2s	¹ S ₀	2s 2p	³ P ₁	[105 073 300]	[212 693 000]		47

Kr xxxv (He sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
0.92795 ^C	1s 2p	¹ P ₁	2p ²	¹ D ₂	105 783 200	[213 548 000]		47
0.92707 ^C	1s 2p	³ P ₂	2p ²	³ P ₁	105 591 700	[213 458 000]		47
0.92609 ^C		1		0	105 068 200	[213 049 000]		47
0.92260 ^C		1		1	105 068 200	[213 458 000]		47
0.92243 ^C		0		1	105 049 100	[213 458 000]		47
0.92145 ^C		2		2	105 591 700	[214 116 000]		47
0.91703 ^C		1		2	105 068 200	[214 116 000]		47
0.92669 ^C	1s 2s	³ S ₁	2s 2p	³ P ₀	[104 691 700]	[212 603 000]		47
0.92591 ^C		1		1	[104 691 700]	[212 693 000]		47
0.92160 ^C		1		2	[104 691 700]	[213 199 000]		47
0.92630 ^C	1s 2p	³ P ₂	2p ²	¹ D ₂	105 591 700	[213 548 000]		47
0.92183 ^C		1		2	105 068 200	[213 548 000]		47
0.92174 ^C	1s 2s	¹ S ₀	2s 2p	¹ P ₁	[105 073 300]	[213 564 000]		47
0.92039 ^C	1s 2p	¹ P ₁	2p ²	¹ S ₀	105 783 200	[214 433 000]		47
0.91851 ^C	1s 2s	³ S ₁	2s 2p	¹ P ₁	[104 691 700]	[213 564 000]		47
0.91437 ^C	1s 2p	³ P ₁	2p ²	¹ S ₀	105 068 200	[214 433 000]		47
0.804587 ^C	1s ²	¹ S ₀	1s 3p	³ P ₁		0	[124 287 400]	
0.803243 ^C	1s ²	¹ S ₀	1s 3p	¹ P ₁		0	[124 495 400]	
0.763477 ^C	1s ²	¹ S ₀	1s 4p	³ P ₁		0	[130 979 800]	
0.762967 ^C	1s ²	¹ S ₀	1s 4p	¹ P ₁		0	[131 067 200]	
0.745906 ^C	1s ²	¹ S ₀	1s 5p	³ P ₁		0	[134 065 200]	
0.745657 ^C	1s ²	¹ S ₀	1s 5p	¹ P ₁		0	[134 110 000]	

Kr xxxvi (H sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
537.3 ^C	3s	² S _{1/2}	3p	² P _{3/2}	[128 585 640]	[128 771 760]		
525.7 ^C	3p	² P _{1/2}	3d	² D _{3/2}	[128 581 180]	[128 771 410]		
159.11 ^C	2s	² S _{1/2}	2p	² P _{3/2}	[108 328 400]	[108 956 890]		
14.4214 ^C	3d	² D _{5/2}	4f	² F _{7/2}	[128 832 870]	[135 767 020]		
14.3217 ^C	3p	² P _{3/2}	4d	² D _{5/2}	[128 771 760]	[135 754 190]		
14.0002 ^C	3s	² S _{1/2}	4p	² P _{3/2}	[128 585 640]	[135 728 370]		
9.86602 ^C	3d	² D _{5/2}	5f	² F _{7/2}	[128 832 870]	[138 968 670]		
9.81322 ^C	3p	² P _{3/2}	5d	² D _{5/2}	[128 771 760]	[138 962 100]		
9.64949 ^C	3s	² S _{1/2}	5p	² P _{3/2}	[128 585 640]	[138 948 880]		
5.03120 ^C	2p	² P _{3/2}	3d	² D _{5/2}	[108 956 890]	[128 832 870]		
4.89156 ^C	2s	² S _{1/2}	3p	² P _{3/2}	[108 328 400]	[128 771 760]		
3.73172 ^C	2p	² P _{3/2}	4d	² D _{5/2}	[108 956 890]	[135 754 190]		

Kr xxxvi (H sequence)

λ (Å)	Classification		Energy Levels (cm ⁻¹)		Int.	Type	$A(s^{-1})$	References
3.64964 ^C	2s	² S _{1/2}	4p	² P _{3/2}	[108 328 400]	[135 728 370]		
3.33275 ^C	2p	² P _{3/2}	5d	² D _{5/2}	[108 956 890]	[138 962 100]		
3.26578 ^C	2s	² S _{1/2}	5p	² P _{3/2}	[108 328 400]	[138 948 880]		
0.9232377 ^C	1s	² S _{1/2}	2p	² P _{1/2}	0	[108 314 470]		
0.9177942 ^C					0	[108 956 890]		54
0.7777188 ^C	1s	² S _{1/2}	3p	² P _{1/2}	0	[128 581 180]		
0.7765678 ^C					0	[128 771 760]		
0.7367656 ^C	1s	² S _{1/2}	4p	² P _{3/2}	0	[135 728 370]		
0.7196891 ^C	1s	² S _{1/2}	5p	² P _{3/2}	0	[138 948 880]		

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